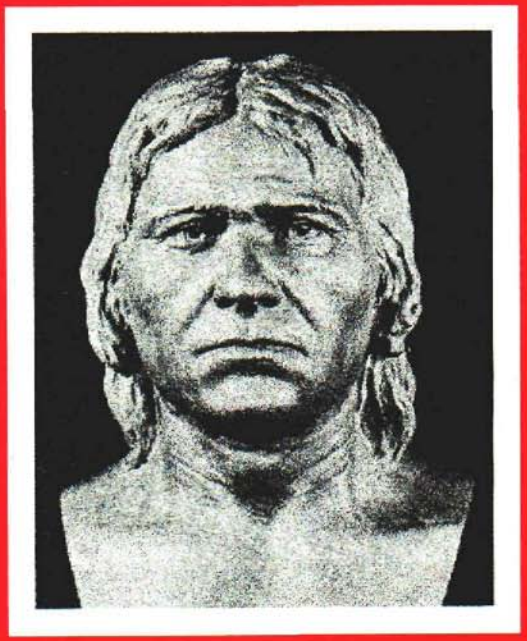
THE MANKIND QUARTERLY



VOLUME XLI No. 3 Spring 2001

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Family, Kin and City-State

Numa Denis Fustel de Coulanges

Edited and Abridged by J. Jamieson

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A RELIGION OF HEREDITY AND THE FAMILY
THE IMPORTANCE OF THE LINEAGE
THE SACRED HEARTH FIRE
MARRIAGE AND THE FAMILY
KINSHIP AND PROPERTY
MORAL LAW
GENS, PHRATRY, TRIBE AND NATION-STATE
THE DOMESTIC RELIGION AND THE MORAL FOUNDATION OF THE ANCIENT CITY-STATE
THE DECLINE OF THE CITY-STATE

The Olympian gods were not the sole source of religion in ancient Greece and Rome. Sociologically more important was the worship of the lineage, symbolized by the hearth fire and the reverence in which the ancestors and *lares* were held.

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Cover Picture: Laboratory reconstruction of early *Homo sapiens*, based on Cro-Magnon fossil remains surviving in Europe. (See Note: *Neanderthalers and Cro-Magnons: A Further Comment*).

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The Human Brain: Conservation of the Subcortical Auditory System

Adam Kircher and K. K. Glendenning[1]
Program in Neuroscience, Florida State University Tallahassee

The results show that the human has the largest subcortical auditory system in terms of absolute size. However, humans have one of the smallest auditory systems relative to their brain size. The results suggest that the human condition is one result of an expansion of non-auditory brain parts rather than a reduction of the auditory system over geological time.

We have found that the subcortical human auditory system is not remarkably different from that of other mammals. In part, this demonstrates that conservatism is a major theme of evolutionary adaptation. To reach this conclusion the volumes of ten subcortical auditory nuclei were measured individually in a human brain and in the brains of 57 other mammalian species. The nuclear sizes relative to the total of subcortical auditory tissue were normalized and analyzed for statistically reliable similarities and/or deviations in the auditory brainstem, midbrain, and thalamus. The overall form of the auditory system of human was compared to that of a selection of species chosen to be reflective of the relative proportion of those species alive today.

In sum, in its overall form the subcortical auditory system is highly similar among mammals, including humans. The data suggests that the overall form of the system has been relatively stable over geological time - probably more than 135 million years.

Key Words: Hearing, humans, evolution, comparative psychology, mammals

Humans and other living members of the class Mammalia all share a common ancestor within the last 250 million years. Among mammals, some neural structures of the brain differ in size by a factor of more than 200 even after adjusting for differences in body size (i.e., Armstrong, 1985; Stephan and Andy, 1969; Stephan et al., 1988, 1991). By contrast, a coordinated enlargement of many independent com-

[1] Corresponding author: K. K. Glendenning, Program in Neuroscience, Florida State University, Tallahassee, Florida 32306-1051. Phone: 850-644-1531, FAX: 850-644-7739

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ponents of a functional system, such as the auditory system, without enlargement of the rest of the brain is less likely. In other words, if one part of the brain gets larger, then usually the entire brain gets larger. That is because the probability of enlargement of a subsystem would be the vanishingly small product of the probability of each component enlarging individually. Because of this, there is a natural conservation of the brain during evolution. That is, the brain is resistant to change. The question arises as to what the significance of a conserved order might be for human evolution and for mammalian evolution generally.

If a species undergoes strong selective pressure for the optimization of hearing and this depends on the size of the central auditory system, what changes take place in the organization of the brain as a whole? Because brain tissue is metabolically expensive, the need for energetic efficiency should result in the most localized possible increase in brain volume, corresponding to the behavioral adaptation. Both specific adaptations and developmental constraints play a role in determining the paths of evolution (i.e., Gould, 1977). From these, an emerging theme of evolutionary adaptation has been that of conservatism. The results of this work reflect this conservatism at brain levels below the neocortex. We have attempted to show that the study of brain specializations both of humans and other mammals and the accompanying alteration or stability of brain structures can yield a formal and quantitative understanding of the range of local adaptations permitted in our evolution and in the evolution of mammals. We present several measures of the degree of conservation of fundamental patterns in the human and in the mammalian auditory system in general.

In contrast to the conservatism of the brain is the environmental pressure for enlargement or shrinkage of certain structures. If humans were strongly selected for their ability to make accurate computations for auditory localization, this would have added greatly to their ability to survive. In turn, the size of nuclei for localization would be relatively large. That is, localization ability depends, in part, on the number of neurons in brainstem and midbrain nuclei.

The present study, then, addresses two theories, one of conservatism and the other based on the supposition that a deviation in size of an auditory nucleus is an indication of its relative usefulness to its host.

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Most variation might be crude and simply reflect a change in the gross rate of neurogenesis (the formation of neurons) for the entire brain. This would open the possibility of extensive pleitropic effects on many behavioral capacities consequent to selection of one behavioral trait. For example, in human evolution theories that start from a primary behavioral trait appear to account for human evolution many times over. Some of these have been factors such as dexterity, tool use, language, group hunting, various aspects of social structure, and our ability to plan for the future. These traits have all been proposed as primary in the cascade of changes leading to the constellation of traits we now possess. Since, small relative changes in brain size are associated with large relative changes in neocortex, this may explain the development of these skills and, in turn, the rapid rate of human evolution (i.e., Finlay and Darlington, 1995).

Our method is that of comparative morphometry. That is, homologous structures are compared across a wide variety of species. We have focused on those nuclei in the auditory system which ultimately send their information to the neocortex. We have chosen to begin at a nuclear level of analysis mostly because more refined levels are not yet practicably measurable over suitably large samples of animals. In addition, whole nuclei are almost certainly homologous while their more refined subdivisions may not be homologous in the same sense. The examination of the relative size of these nuclei is based on the assumption that the deviation from the mean in the relative size of an auditory nucleus is an indication of its relative usefulness to its host. If this proposition is accepted, it follows that the form of a multi-nuclear neurological system (auditory or otherwise) might be one of the more sensitive indicators of the presence of special selective pressures in mankind's environment and vice versa.

Previous reports have established the usual form and variation of the auditory system (Glendenning and Masterton 1978, 1994, 1995, 1998; Glendenning 1995, 1996, 1997a, 1997b; Glendenning and Kircher, 1999). Here we have extended these reports by singling out the human to compare with other mammals and by the addition of five more rodent species. Although the 'usual' or average form that has been established can be used for taxonomic, phylogenetic, and/or ecological analyses, we use it here only for a practical purpose: It provides a means by which the human system can be compared to that of a representative sample of other mammals alive today.

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Animal	Weight in Grams		Auditory Nucleus (Volume in cubic mm)			
	Brain	Body	Brainstem	Midbrain	Thalamus	total
ARMADILLO	7.54	5,000.00	11.0	30.0	8.0	49.10
BANDICOOT	6.16	4,995.00	3.0	11.0	2.0	15.90
BAT, Little Brown	0.18	8.61	1.0	0.8	1.0	2.98
BEAVER	36.50	17,600.00	9.0	40.0	19.0	68.90
BUSHBABY	3.20	210.00	1.0	1.0	0.7	3.56
CAPYBARA	51.00	7,800.00	18.0	55.0	42.0	115.00
CAT	19.08	3,068.00	20.0	43.0	41.0	104.00
COLOCOLO	0.69	26.00	0.6	2.0	0.4	2.65
CHINCHILLA	5.00	580.00	6.0	8.0	5.0	24.11
DEER	160.00	40,000.00	31.0	83.0	61.0	175.00
DUNNART, Darling Downs	0.46	21.10	0.4	2.0	0.5	3.31
FOX, Red	40.00	9,000.00	22.0	34.0	16.0	72.00
GLIDER, Yellow-bellied	6.20	595.00	0.8	4.0	1.0	6.18
GLIDER, Feathertailed	0.38	14.40	1.0	1.0	0.3	2.81
GLIDER, Greater	4.14	1,350.00	1.0	8.0	5.0	15.40
GLIDER, Sugar	2.69	130.00	1.0	4.0	3.0	7.92
GOPHER, Pocket	1.35	175.00	2.0	1.0	0.3	3.20
GUINEA PIG	4.60	415.00	6.0	8.0	5.0	19.51
HEDGEHOG	2.26	372.00	2.0	5.0	4.0	11.00
HUMAN	1,240.00	64,922.00	53.0	76.0	58.0	187.00
KANGAROO RAT	0.39	35.00	2.0	2.0	0.5	4.63
KANGAROO, Eastern Grey	73.90	82,000.00	6.0	25.0	22.0	53.90
LEMUR, Brown	9.50	2,000.00	8.0	9.0	6.0	23.50
LLAMA	200.80	60,000.00	21.0	57.0	33.0	111.00
LORIS, Slow	7.88	965.00	4.0	6.0	3.0	12.40
MARMOT, Yellow-bellied	11.35	1,317.00	3.0	8.0	3.0	13.00
MARSUPIAL MOUSE, Dusky	0.59	18.00	0.6	1.0	0.3	2.32
MINK	9.30	1,495.00	3.0	6.0	4.0	12.70
MOLE	0.57	53.00	0.3	0.6	0.4	1.34

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MOLE RAT	0.51	50.00	0.9	1.0	1.0	3.05
MONKEY, Green	36.54	1,370.00	3.0	5.0	7.0	15.40
MONKEY, Macaque	53.70	3,300.00	4.0	9.0	9.0	22.20
MOUNTAIN BEAVER	5.86	680.00	4.0	7.0	5.0	16.00
MOUSE	0.40	27.00	1.0	0.9	0.2	2.28
MOUSE, Deer (Whitefooted)	0.53	21.70	1.0	3.0	1.0	5.06
MOUSE, Grasshopper	0.64	37.00	1.0	3.0	0.8	4.83
MOUSE, Spiny	0.76	44.00	1.0	3.0	0.7	3.99
OPOSSUM, Didelphis	4.36	2,727.00	4.0	5.0	0.9	11.80
OPOSSUM, Marmosa	0.51	54.00	1.0	5.0	0.6	6.85
OPOSSUM, Monodelphis	0.79	83.00	2.0	5.0	0.7	7.20
POSSUM, Honey	0.33	14.20	0.4	1.0	0.2	1.78
POSSUM, Leadbeaters	2.38	109.50	1.0	4.0	0.9	5.44
POSSUM, Ring-tail	5.43	840.00	2.0	6.0	2.0	9.99
POSSUM, Striped	6.85	410.00	1.0	7.0	2.0	9.91
POUCHED MOUSE, Jumping	0.59	22.90	0.5	2.0	0.2	2.33
PRAIRIE DOG	4.96	1,250.00	3.0	10.0	3.0	16.44
QUOLL	2.89	550.00	2.0	12.0	2.0	16.80
RABBIT	7.57	5,230.00	4.0	7.0	3.0	13.80
RACCOON	27.40	4,309.00	10.0	10.0	5.0	24.50
RAT, Albino	1.50	268.00	2.0	6.0	2.0	10.60
RAT, Cotton	1.03	145.00	2.0	8.0	2.0	10.94
RAT, Norway	2.17	226.00	4.0	15.0	2.0	22.47
RAT, Pack (or Florida mouse	2.34	331.00	3.0	7.0	2.0	11.22
SHEEP	125.90	32,950.00	10.0	24.0	19.0	52.90
SQUIRREL	6.49	367.00	3.0	10.0	3.0	15.90
TREE SHREW	2.02	145.00	2.0	5.0	3.0	9.37
WALLABY, Little Rock	8.39	1,020.00	3.0	11.0	4.0	17.90
WALLABY, Swamp	34.36	10,000.00	9.0	31.0	13.0	52.60

TABLE I shows the raw morphometry data. The entries in the Table are the in vitro volumes (in cubic mm) of the auditory Brainstem, Midbrain and Thalamus and their calculated sum (total) in each of the 58 animals. In addition, Column 1 shows the brain weight and Column 2 shows the body weight for each animal. The totals were used to derive the relative volumes of the nuclei in percentages of the total subcortical system hence standardizing the entries for inter-animal comparison.

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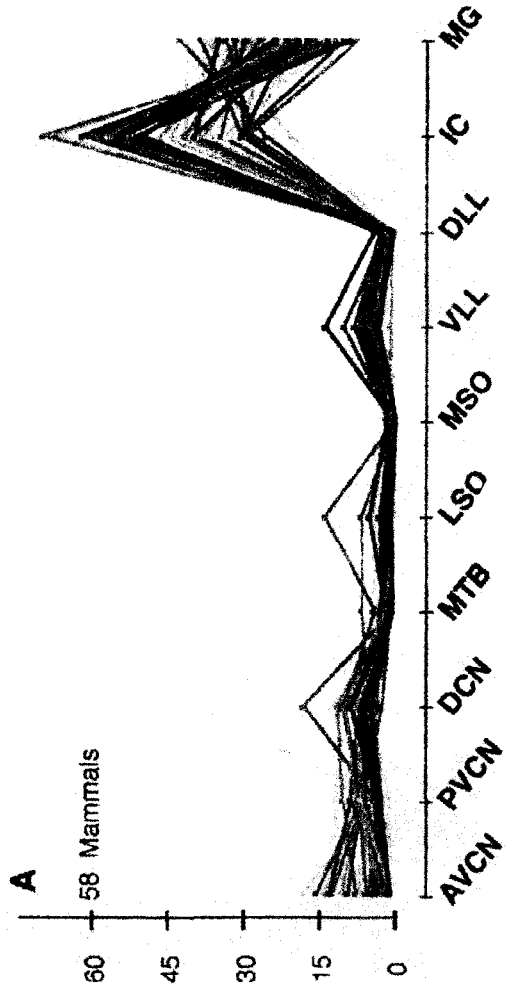

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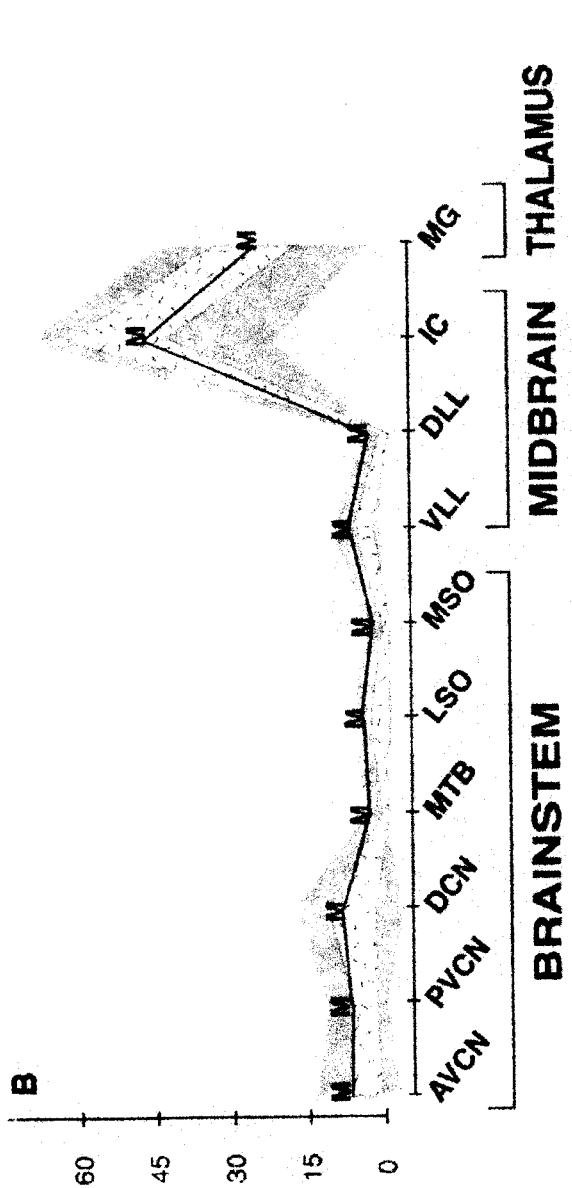

Figure 1. Variation in form of brainstem auditory system among 58 viviparous mammals. A: Line plots of sizes of the 10 nuclei in the 58 animals. Each line represents one animal; each point interconnected by one line represents the relative size of the nucleus in that animal. B: Statistically derived mean (M) and dispersion [mean +/- 0.67 std. dev. (inner area) and +/-2 std. dev. (outer shaded area)] of each nucleus. The outer gray area contains about 95% of the animals in the sample.
BRAINSTEM: [AVCN: anteroventral cochlear nucleus; PVCN: posteroventral cochlear nucleus; DCN: dorsal cochlear nucleus; MTB: medial nucleus of the trapezoid body; LSO: lateral superior olive; MSO: medial superior olive]; MIDBRAIN: [VLL: ventral nucleus of lateral lemniscus; DLL: dorsal nucleus of lateral lemniscus; IC: inferior colliculus]; THALAMUS: [MG: medial geniculate].

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In this report, we compare the human to other mammals to see if it differs from the others either in its individual auditory nuclei or the overall form of its auditory system.

METHODS

Relative Sizes of Nuclei

In order to quantify the form of the auditory system, the ten largest nuclei in the ascending auditory system were chosen for volumetric measurement: These included six nuclei in the *brainstem* [Dorsal, Posteroventral and Anteroventral Cochlear Nuclei, Lateral and Medial Superior Olivary Nuclei, and Medial Nucleus of the Trapezoid Body], three nuclei in the *midbrain* [Ventral and Dorsal Nuclei of the Lateral Lemniscus and Inferior Colliculus], and one nucleus in the *thalamus* [Medial Geniculate, see Table 1].

The volume of these ten nuclei was measured in 58 species of mammals. The human and 52 were published in previous reports (Glendenning and Masterton 1994, 1995, 1998; Glendenning 1995, 1996, 1997a, 1997b; Glendenning and Kircher, 1999; Masterton and Glendenning, 1994). The addition of five more rodents allowed us to make the representation of the various orders accurately reflect proportions of species alive today (see "representativeness of sample" below). The sizes of the nuclei make up a profile of the overall 'form' of each animal's auditory system (see Fig.1). The collection of these forms provides the statistical basis for describing the usual form of the system and serves as a basis for the comparison of the human system to that of other mammals. For details of measurement and sources of the materials, see Glendenning and Masterton, 1998; see also Senter, 1969, Rohlf and Marcus, 1993; Boole, 1958; Fleagle, 1985). An overview is given below.

Figure 1A shows the profile of each animal in this study. Figure 1B is a statistical summary of Figure 1A. It consists of a line graph of nuclear means and a shaded area surrounding it. The inner shaded area represents the mean +/- .067 standard deviation, and the outer shaded area represents +/- 2 standard deviations around the average percentage of each nucleus for the 58 animals. Therefore, the outer shaded area contains about 95% of the animals in the sample and will be referred to as the 'usual form' of the auditory system. The present purpose is to compare the human form to the usual form of the

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auditory system.

Calculation of Nuclear Volumes

Equidistant coronal sections of brain tissue were systematically measured for the volume of individual nuclei. This final value (in cubic mm) was used as the raw estimate of the *in vitro* volume of each nucleus.

Despite the lack of morphological refinement of drawing nuclear groups the random measurement error was less than 3% within each animal in the sample.

Statistical Analysis

After raw volume measurements were obtained for each of the ten nuclei in each of the 58 animals, the sum of the ten nuclei in each animal was obtained. This sum for each animal is referred to as 'total' in Table 1 and the graphs to follow. It was used as the divisor of each of the ten nuclei to obtain the percentage of each nucleus within each animal. These percentages are unit-less numbers and hence, they are not subject to a bias due to uniform shrinkage of the brain. Moreover, the use of these relative sizes means that relationships between the nuclei and other non-nuclear measures such as body size are obviated.

Arithmetical calculations and statistical descriptions and inferences were then performed on these data after appropriate transformation and normalization.

In order to establish the degree of similarity of the Human system to, or deviation from, the usual form of the system the least-squares correlation coefficient was calculated between the average form and the form of the system in human. Calculated from the log normalized data to give each nucleus more equal weight, the resulting correlation, ($r=0.922$), is a relatively unbiased estimate of the degree of similarity of the human subcortical auditory system to the usual form.

Representativeness of Sample

Of the mammals alive today, 30% are bats and almost 40% are rodents! In the present study, measurements were obtained for 58 individual species representing 58 genera, 36 families, 13 orders, and 2 subclasses of Mammalia (see Figs. 2 and 3). The selections were based mostly on taxonomic and paleontological grounds. The taxonomic grouping of species used is shown in Fig 2A for Marsupials and

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Subclass	Order	% total mammal pop. Actual	Sample	Suborder/Superfamily		Family		Genus Species		Common Name
Placental	Artiodactyla	7.4	5.2	Ruminantia: Bovoidea	(2)	Bovidae	(47)	Ovis aries		Sheep
				Cervoidea	(1)	Cervidae	(17)	Odocoileus virginianus		Deer
				Tylopoda	(1)	Camelidae	(3)	Llama peruana		Llama
	Carnivora	8.4	6.9	Aeluroidea	(3)	Felidae	(4)	Felis catus		Cat
				Arctoidea	(4)	Canidae	(16)	Vulpes vulpes		Red fox
						Mustelidae	(23)	Mustela vison		Mink
						Procyonidae	(7)	Procyon lotor		Raccoon
	Chiroptera	16.9	1.7	Vespertilionoidea	(7)	Vespertilionidae	(42)	Myotis lucifugus		Bat (little brown)
	Insectivora	5.9	3.4	Lipotyphla	(7)	Erinaceidae	(9)	Erinaceus europaeus		Hedgehog
						Talpidae	(15)	Scalopus aquaticus		Mole
	Lagomorpha	1.2	1.7	None		Leporidea	(13)	Oryctolagus cuniculus		Rabbit
	Scandentia	0.5	1.7	Tupaioidea	(1)	Tupaiidae	(1)	Tupaia glis		Tree shrew
	Primates	6.5	10.3	Anthropoidea	(5)	Cercopithecidae	(16)	Cercopithecus aethiops		Monkey (green)
								Macaca mulatta		Monkey (macaque)
						Hominidae	(1)	Homo sapiens		Human
				Prosimii	(6)	Lemuridae	(5)	Petterus fulvus		Lemur (brown)
						Lorisidae	(8)	Galago Senegalensis		Bushbaby
								Nycticebus coucang		Slow loris

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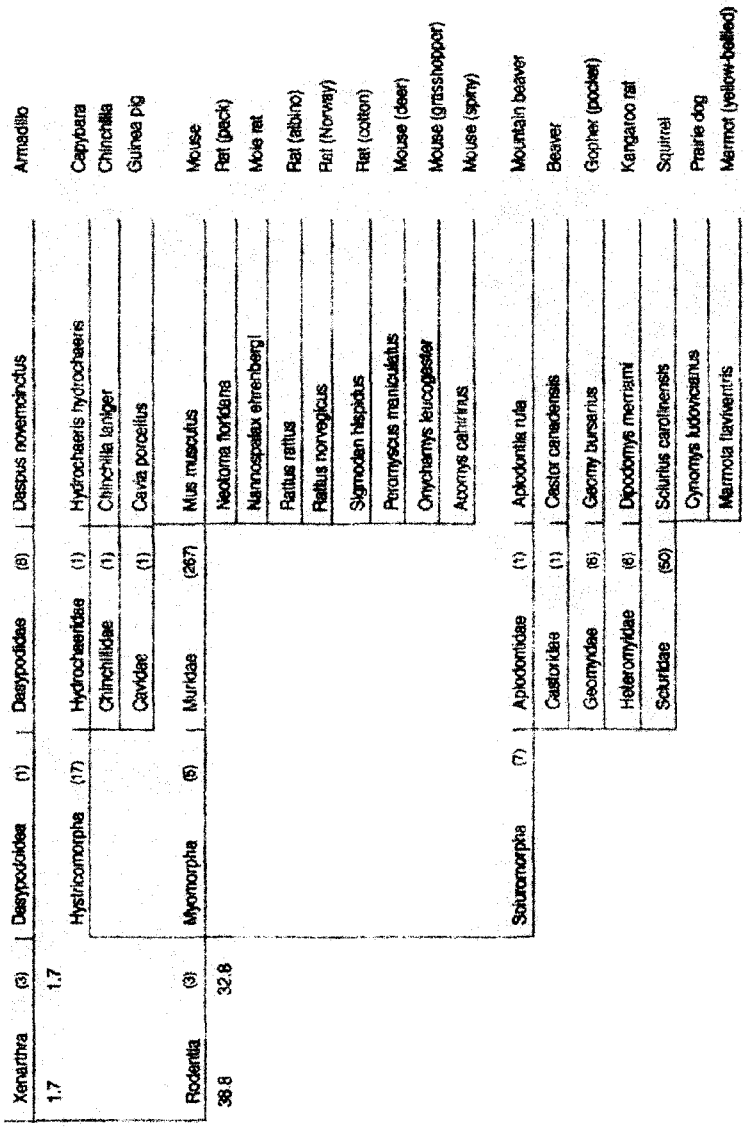

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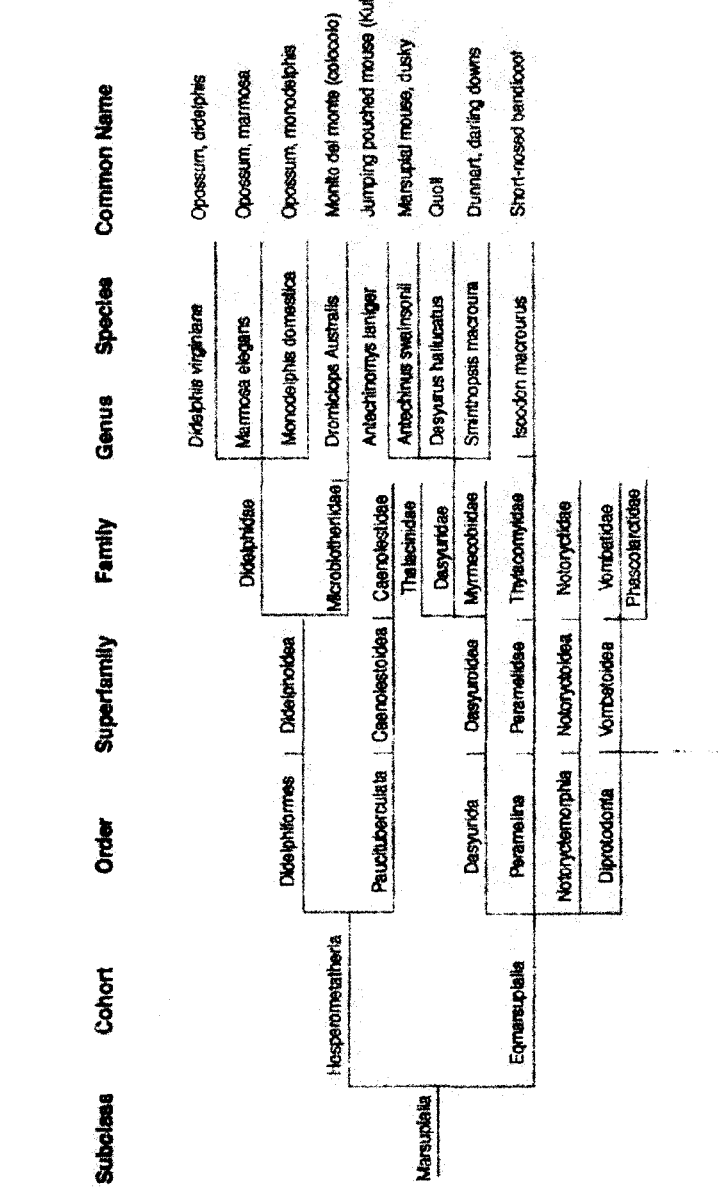

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Figure 2. Cladograms of Placental (2A) and Marsupial (2B) species used in present study. The common name of the species is on the far right. The branches go left to the stem to show the family, superfamily, and order of the subclass Placental and Marsupial. The Percentage of actual total mammals is the left number in "order" column. The Percentage of that order in the present sample is the second number. Numbers in parentheses represent the number of divisions in the next lower category (e.g. there are 47 genuses of Bovidae of which there is one in the sample, the sheep). Taxonomic categories are from Nowak, 1991.

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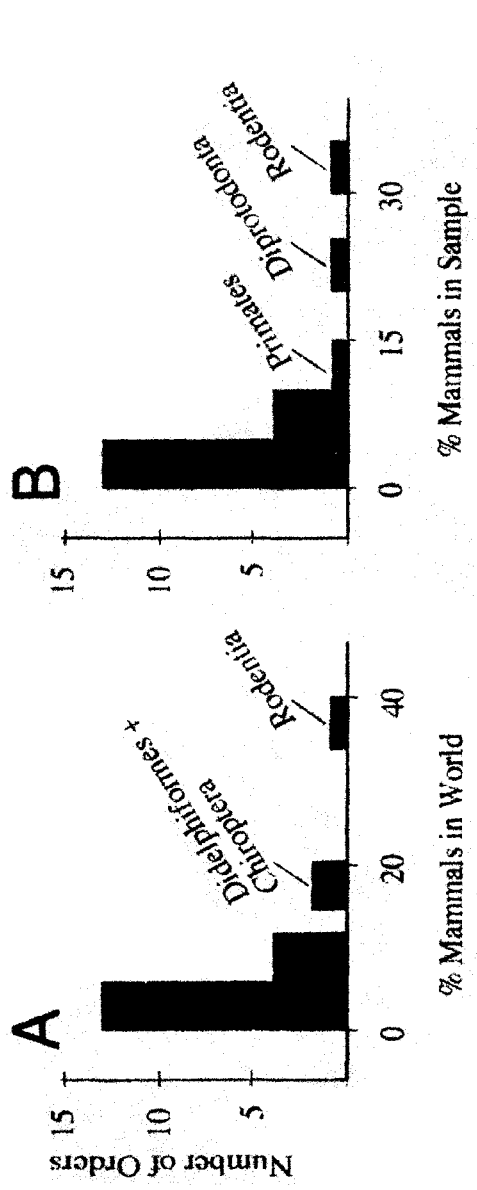

Figure 3. Actual (A) and sample (B) distributions of major mammalian orders (in genera per order). Note that almost 40% of the actual distribution of the Mammals belongs to the order Rodentia. The sample distribution has over 30% of the order Rodentia. The Chiroptera and Didelphiformes make up the second largest percentage (almost 20%) in the actual distribution but are *underrepresented in this sample*. The sample overrepresents the orders Diprotodonta and Primates.

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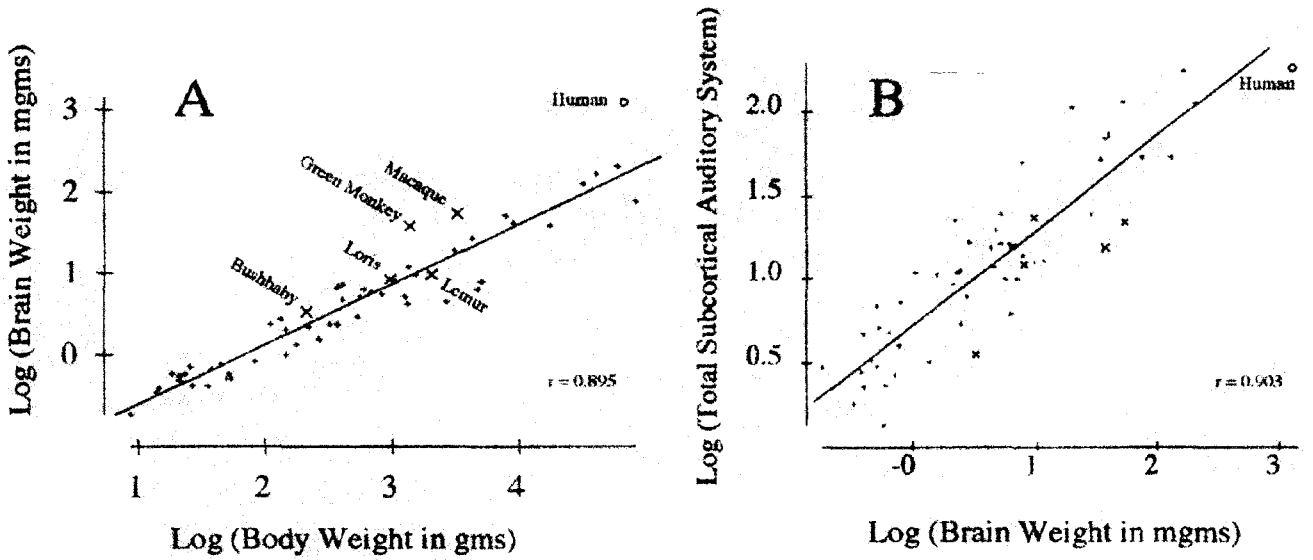

Figure 4. A: A scatterplot of the log brain weight/log of body weight of the mammals used in the present study. The correlation of r=0.895 shows that the heavier (larger) the body, the heavier (larger) the brain. Since the cell packing density is roughly similar for species, we have sometimes substituted the word "size" for "weight." Note that all but one of the primates are above the regression line indicating a relatively larger brain size compared to body size. The brain size of Human is remarkably larger compared to its body size. This is due primarily to the expansion of the neocortex (i.e., Jerison, 1991; Hofman, 1982, Finlay and Darlington, 1995). B: Scatterplot of relationship of (log) volume of subcortical auditory system to (log) brain weight. The size of auditory system remains reliably related to brain size. Five of the six Primates (X) in the sample are below the regression line indicating an unusually small auditory system given the large brain size. This is probably the result of a radically expanded vision-related cortex. In sum, Fig. 4 shows that the Human brain is proportionately bigger than that of other mammals, but its subcortical auditory system is not. In both figures, each point represents one animal. Human (0) and primates (X) can be compared to other mammals.

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Fig 2B for Placentals. In this study there is an over weighting of Marsupials, and Primates and an under weighting of Chiroptera (bats; see Fig. 3).

Although the sample size of 58 seems sufficiently large to gain some measure of confidence, its usefulness in estimating the characteristics of the auditory system in the population of viviparous mammals, marsupials and placentals together, depends on its randomness, not just its size.

Strictly speaking, any statistical inference from sample to population to which a precise probability statement can be attached usually requires a random sample. The problem of biological morphometry, however, is that a truly random sample of a large taxon, such as the class of Mammals, is simply not possible to achieve: a truly random sample will call for species that are not available due to their rarity, geographic isolation, endangered status, etc. Therefore, while we examined 58 diverse species, they do not constitute a random sample. Given the practical impossibility of true randomness, the next less strict question becomes: Is the sample 'representative'? This question can be answered by comparing the distribution of the animals in the sample with the actual worldwide distribution of mammals.

Figs. 2 and 3 show the distribution of viviparous mammals in terms of genera per order (genera being the lowest taxa which are usually unargued among taxonomists; e.g., Simpson, 1945). The actual worldwide percentage of genera per order for the six orders of Marsupials and for the 14 largest orders of Placentals is shown in Figure 2 and 3A (cf., Nowak, 1991). In comparison, the number of genera per order in the present sample is shown in Figures 2 and 3B. That is, the present sample is not a representative sample of all mammals. To begin with, there are far too many marsupials in the sample (37.7% in the sample versus vs. 7.1% in the world). This over weighting of Marsupials is done intentionally because a future goal of this work is to determine pervasive taxonomic differences among the animals.

Within the Marsupials, the sample proves to be a fairly close representation of the actual distribution of Marsupial genera per order (Fig. 2B). The sample proves to be within 10% for each of the six orders of Marsupials. That is, while the present sample of Mammals is seriously over weighted with Marsupials the sample of Marsupials

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itself is reasonably representative.

Turning to the Placentals, there are 33 genera in the sample representing the actual 1021 genera of Placentals in the 14 largest orders (Fig. 2A). The addition of five rodents to our previous data (Glendenning and Masterton, 1998) makes the sample representative of the contribution (almost 40%) of the order Rodentia to mammals as a whole.

Comparison of Fig 3A and B shows the difference between the percentages in the sample and the worldwide percentages. There are two notable deviations. To begin with, Primates are over-weighted by 3.8%. This over-represents Primates by 8.8% in terms of total Placentals (see Fig. 2A). This over weighting of Primates is to allow us to trace the evolution of the ascending auditory system along the human lineage and since most of the ancestors in the human lineage are Primates, this extra number of Primates is justified.

For the purpose of judging the representativeness within the Placental sample, the most serious deviation is found in Chiroptera (bats). The sample under-represents Chiroptera by 15.2% in terms of total Mammals and under-represents Chiroptera by -15.6% in terms of total Placentals. In terms of numbers of genera, there is one genus of bats in the sample while there should have been eight.

In sum, only one (Chiroptera) of the 19 orders of Placentals in the sample varies from the actual worldwide distribution by more than 6%.

Results and Discussion

The technique for estimating the volumes of the auditory nuclei introduces several kinds of measurement error. These are discussed in a previous paper (Glendenning and Masterton, 1998) but here we would like to mention one of them: the validity error that results from using only one animal to represent a species or genus.

A source of potential error in morphometry studies of many species is the use of a single individual to represent an entire species. However, by comparing representative species and deriving a common form of the auditory system we can represent 95% of terrestrial mammals. Then we can look for deviations from this form. We use a similarity index and show how much man differs in each category (brainstem, midbrain or thalamus, see Glendenning and Masterton, 1998). Moreover, the relative age and gender of the individuals are often undocumented. This study is no exception. For example, almost

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80% of the brains were from adult male animals. However, the use of relative measures and unit-less statistics minimizes the potential problem of gender differences.

Morphometry Results

As discussed previously, the comparison of human to other forms of the mammalian auditory system was possible by standardizing the array of nuclear volumes. The nuclei were grouped according to general subdivisions of the brain: The Brainstem (six nuclei), midbrain (three nuclei), and thalamus (one nucleus). These standardized data, shown as entries in Table 1 and Fig 1., are the sizes of each nucleus within each animal relative to the size of its total subcortical auditory system.

Variation in Relative Size of the Auditory System

The absolute size of the entire subcortical auditory system varies more than 139-fold among the 58 animals in the sample (see mole vs. human data in last Column, Table I). Although this amount of variation might seem large, it is quite small compared to the 3700-fold range of variation in brain weights (see honey possum vs. human data in Table I) and the 48,000-fold variation in body weights (see bat vs. deer in Table I, also see Fig. 4A). This range of variation in size among the animals in the sample is quite comparable to that obtained from still larger samples of mammals (e.g., see Hofman, 1982; Finlay and Darlington, 1995). The relation of brain size to body size is shown in Figure 4A. The human brain is remarkable for its large size in proportion to body size. Our results suggest that the enlargement of the human brain is the result of expansion of non-auditory brain parts rather than the reduction of the auditory system over geological time. That is, the human brain is large but its auditory core has changed remarkably little.

To illustrate this point, Figure 4B shows the distribution of the sizes of the total subcortical auditory system relative to brain weight. Using the conventional log (raw volume) transformation to normalize the distribution, Figure 4B shows that despite the histological error in the raw data, the total size of the ascending auditory system remains related to brain size ($r = 0.903$; $p < 0.0001$). Further, from this figure it can be seen that the Human has a relatively small auditory system for its brain size. That is, Human is above the regression line in Figure 4A

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but below it in 4B.

Figure 5 compares the core of the human auditory system to the mammalian average. From this it can be seen that the core of the human system is highly correlated to that of other mammals (r=0.922). Thus, for humans, the subcortical auditory core is similar to other mammals but the brain is much expanded.

That is, in human the small ratio between its auditory system compared to total brain size is the passive result of a very large brain (the fraction's denominator) rather than a small auditory system (the fraction's numerator). That is, Human has the largest auditory system (187 cubic mm) and the largest brain size (1240 gm; see Fig 4 and Table 1). However, the auditory system expansion falls short of the total brain expansion. As a result, there is a small auditory system/brain size ratio. That this small ratio is the secondary result of the expansion of other, non-auditory, brain parts is supported by noting that each of the six Primates (shown by Xs) in the sample have an auditory system/brain size ratio smaller than the sample average ($p = (1/2)6 = 1/64 = 0.016$). Further, the ratio becomes progressively smaller over a 3-step sequence among the families of primates leading up to Humans: Prosimians (bushbaby, loris, lemur), Anthropoids (macaque and green monkey), and Hominoids (human; Glendenning and Masterton, 1995).

That is, in mammals with large brains, and most notably in humans, the brain becomes disproportionately composed of neocortex. Further, the volume of the neocortex is closely predictable from total brain size across a wide range of species (i.e., Jerison, 1991; Hofman, 1989). The neocortex quickly expands in volume relative to other structures as brain size increases. As a result, while the human brain is some 21,400 times the size of the brain of the smallest shrew, the human neocortex is some 142,000 times larger than that of the shrew (i.e., Finlay and Darlington, 1995).

Much of the neocortical expansion, at least in Primates is because they are highly visual with expanded occipital and temporal lobes. But while the enlargement of the Primate and therefore Human brain is due in large part to the visual expansion, it has been shown (using essentially the same methods used here) that non-cortical auditory and visual nuclei are unrelated (Johnson and Kirsch, 1993). That is, the size of the auditory system in primates is not affected, at least in size, by their reliance on vision. Therefore, deviations above the regression

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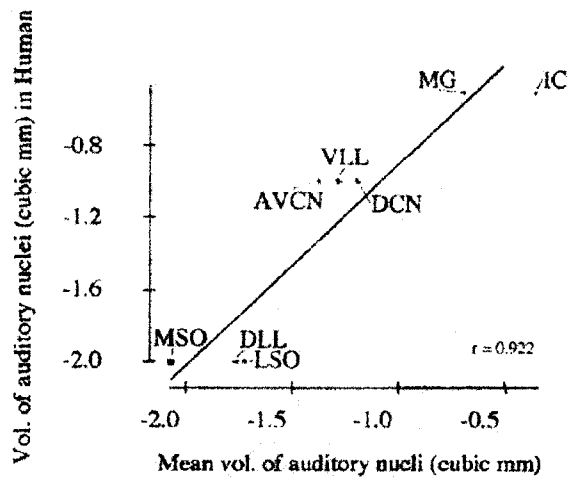

Figure 5. A comparison of the subdivisions of the human subcortical auditory system to the average mammalian system. The relatively high correlation (r= 0.922) shows that the size of the auditory nuclei of the human brain correspond highly with the average size of these nuclei in other mammals.

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are properly interpreted as unusually large auditory systems. On the other hand, deviations below the regression line are not so easily interpreted. They are often the result of the expansion of other, non-auditory, structures included here in the brain weight measurement and not in the auditory system measurement such as the large cerebral hemispheres in the Primates.

Ecological Demands

Our past environment was much quieter than our current one (i.e., Rosen, et al., 1979; Newby, 1979). It can be argued that the environment is noisier today for man than it is for most other mammals. Cars, television, concerts etc. are noise pollutants the cave dweller did not enjoy! In addition, in our past the "signal to noise ratio" was greater as was man's reliance on his ability to localize sounds (i.e., Rosen, et al., 1979; Newby, 1979). Yet, in spite of these pressures, our subcortical auditory system does not differ remarkably from that of other mammals. In the auditory system (and all systems) evolutionary change is slow. The major question is in what direction the change is proceeding. Are we getting a stronger more robust auditory system, one adapted to skills other than sound localization? Alternatively, are we going in the direction of a vestigial system that might not be good for much if our environment drastically changed so that sound localization became once again a needed skill? Is the system changing slowly because it is already sufficient for our needs? Perhaps we no longer need such strong auditory skills. It may be undergoing slow adaptation because we are not as dependent on it for our survival. That is, perhaps what we have "inherited" from our ancient past is sufficient for our current needs. Is the core auditory system changing slowly because with modern devices such as hearing aids, there is no longer selective pressure on the system (cf. Bang and Cobb, 1968)? What we can be certain of is that the system is evolving. We simply do not know if the changes will decrease or increase certain basic survival skills (such as sound localization). The system has not yet evolved for optimal adaptation to the present environment. Nor should it, since environmental changes often reverse themselves. That is, perhaps there will be increasing political pressure to reduce environmental noise and, in turn, a century of quiet peacefulness will ensue!

The quest for a direct correspondence between a deviant nucleus and its host's current ecological niche is usually disappointing and

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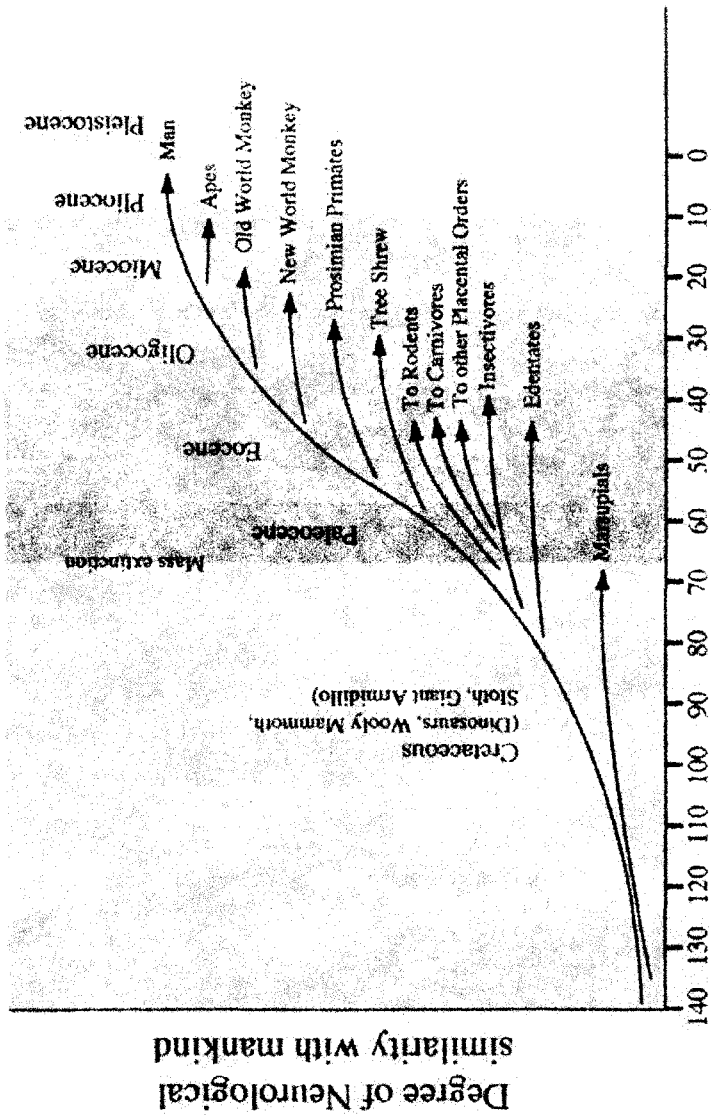

Figure 6. Geological time line to show the approximate time of emergence of mammalian species. Note that the split of the subclass marsupials and placentals occurred about 135 million years ago. Thus, while Man has been on the planet for only 4 million years, the subcortical auditory system has been relatively unchanged for 135 million years.

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sometimes misleading. One of the reasons for the absence of a correlation between the human auditory system and our somewhat excessive auditory environment is due to the effects of the special ecologies of our geological past. This remote geological time has left a stamp on our entire auditory system. That is, while there continues to be an ongoing sequence of re-adaptations to our recent ecology of an often-noisy environment, the resulting structural differences will accumulate slowly. Until this point in time, the structural change has been nearly equal in all mammalian species since the original divergence of the mammalian taxa (see Fig. 6). Thus, several of the auditory nuclei are reliably different between the two subclasses represented (i.e., Marsupials vs. Placentals) but not among the taxa at lesser levels. For example, the thalamic auditory nucleus is reliably different between the subclasses Marsupials and Placentals ($r = 9.0147$; $p < 0.004$, Glendenning and Masterton 1994, Masterton and Glendenning 1994). However, the thalamic auditory nucleus is not reliably different either among successive orders, families, or genera within the two subclasses ($p > 0.05$). Marsupials and Placentals diverged about 135 million years ago (sometime before the Paleocene and possibly as long ago as the Jurassic). Therefore, these differences in the size of the thalamic auditory nucleus may have occurred near the time of divergence and/or over the subsequent 135 million years.

Conservation of the Auditory System

Present results show that the size and profile of the auditory Brainstem is similar in humans as compared to other mammals. The brainstem in humans is 24% of the size of the total subcortical auditory system size versus 20% of total size in the average mammal. Selective pressures for the use of ear-transduced environmental cues are greater for nuclei synaptically closer to the ear (e.g., the brainstem nuclei) than to nuclei synaptically more remote from the ear (e.g., the thalamic nuclei). If this idea of synaptic insulation from environmental vagaries is correct, it is correspondences between the form of the cochlear nuclei and current environmental demands that might be easier to find because these nuclei might have responded more quickly to changes in strictly auditory demands and hence, reflect current ecologies. Support of this theory comes from the finding that one (the DCN) of the six brainstem nuclei is less well defined in the human brain (Moore 1980, 1987). Although this apparently did not result in a reduction in its size.

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Present results also show that the size and profile of the auditory midbrain and thalamus are similar in humans as compared to other mammals. The thalamus in humans is 31% of the size of the total subcortical auditory system size versus 24% of total size in the average mammal.

It may be useful for us to have such a robust system. One that is insulated from ongoing environmental pressures. Slow adaptation affords us some degree of protection from a changing environment. In fact, if our species does not survive we can rest assured that the auditory system will endure without us. Currently, there are 40,000 chordate species on earth, and 4,000 of these are mammals. In addition, estimates show that we are losing 30,000 (of the million) species each year and that 50 percent of living species could be lost in 50 years (i.e., Wilson, 1992). Although most species have made it through the last 100 years, an estimated 20% —some 120 types of prosimian monkeys and apes will be at severe risk of extinction within the next two decades (ibid). Perhaps from this we can take some comfort in the fact that the subcortical auditory system will live on, as will most of the core systems of our brain!

In sum, the human subcortical auditory system is remarkably similar to that of other mammalian species. Biologically, the high degree of similarity of human to other placental species and to marsupials suggests that the overall form of the auditory system has been relatively stable over geological time. And insofar as long periods of geological time allow wide variations in ecology, the auditory system seems notably resistant to great change.

Acknowledgements

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Crime as Destiny
A Study of Criminal Twins

Professor Dr. J. Lange

Departmental Director, Kaiser Wilhelm Institute

Translated by Charlotte Haldane

Foreword by J. B. S. Haldane

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CONCLUSION

This is a reprint of the original 1931 translation by Charlotte Haldane of the pioneer 1928 study conducted by J. Lange of the criminal records of a number of monozygotic and dizygotic twins. It is a classic work of outstanding interest to all who students of criminology, heredity or twin studies.

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The Impact of Cross-Cultural Contact on Value and Identity: A Comparative Study of Chinese Students in China and in the U.S.A.

Jian Guan[1]
Penn State University-Delaware County
Richard A. Dodder[2]
Oklahoma State University

This study explores relationships between cultural contact and value change. Surveys were conducted to compare students having cross-cultural contact (Chinese students in the US, N=107) with students without contact (Chinese students in China, N=185) on value scores. The Chinese Value Survey (CCC, 1987) was used as the instrument for observing value differences between these two samples. Cross-cultural contact was found to be associated with value change among Chinese students. However, changes occurred in opposite directions. Students with contact thought the value of cultural conservation was less important than those without contact. Those staying in the U.S. over two years viewed cultural conservation as less important than those in the U.S. less than two years. Surprisingly, students with contact viewed the values of group integration and self-protection as more important than students without contact. In-depth interviews (N=25) among Chinese students in the U.S. provided further interpretations, suggesting that cross-cultural contact can result in changes – some values decrease their significance among Chinese students for cultural adjustment while others increase their importance for cultural identity.

The world has become a global village in which members of different cultures find themselves face-to-face. Consequently, diverse cultural value systems come into contact. Cultural values have been of lasting interest to scholars in multiple disciplines; however, it is the

[1] Jian Guan, Department of Sociology, Penn State University-Delaware County, Media, PA 19063, Phone: (610) 399-4636, Fax: (610) 399-0906, Email: jxg30@psu.edu
[2] Richard A. Dodder, Department of Sociology, Oklahoma State University, Stillwater, OK 74078, Phone: (405) 744-6122, Email: rdodder@okstate.edu

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accelerated globalization that has turned such classic topics as value clash and cultural identity into timely issues. While most cross-cultural studies compared value differences with peoples from distinctive cultures (Chung, Walkey and Bemak 1997; Hofstede 1980; Hui 1990; Hus 1981; Stipek 1998; Ting-Toomey 1988; Triandis, Brislin and Hui 1988), the current study utilized samples from the same cultural tradition but with different interaction contexts; i.e., Chinese students in China and Chinese students in the U.S.

There has been an increasing realization that cultural values of international students may experience change from their continuous interaction with the host culture and society (Brislin, 1981; Furnham, 1988; Hull, 1978; Kim and Ruben, 1988; Searle and Ward, 1990). According to these studies, those who have adapted their cultural values to new cultural environments may function better in the host society. Other researchers emphasize the aspect of cultural conflict. They have demonstrated that cultural value differences and conflicts broadly exist among immigrant groups (Adler, 1975; Casimir and Keats, 1996; Gudykunst and Kim, 1984; Triandis, 1977). The complexity of cross-cultural interaction has been especially discussed between eastern and western value systems (Bond 1988; Bond and Hwang, 1986; Church, 1982; Hui, 1990; Hall, 1976; Smith, 1994; Ting-Toomey, 1988; Triandis, Brislin and Hui, 1988). The significant impact of cultural contact on racial and ethnic relations has received continuing attention (Feagin, 1991; Kitano, 1974; Marger, 1994; Thomas and Hughes, 1986; Williams, 1977; Yetman, 1985). Yet many studies have focused on the effects of ethnocentrism and racial discrimination on cultural values and ethnic identity (Chen, 1981; Chen and Yang, 1986; De Vos, 1990; Paige, 1990; Triandis, 1990). The most recent research on acculturation processes contributes greatly to the understanding of Chinese students in western societies, such as Australia (Hird, 1997; Da, 1998), Canada (McCrea et al., 1998), and the U.S. (Ying and Liese, 1994; Zhang and Rentz, 1996).

The current research investigates the process of cross-cultural contact and its effects on value change and cultural identity. In this regard, early literature states that an effective intercultural communication depends on the degree of information exchange and mutual understanding between guest and host cultures (Martin, 1984). Through the stress-adaptation-growth process of communication, individuals go beyond the cognitive, affective, and behavioral limits of

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their original culture and eventually become intercultural (Kim and Ruben, 1988). The focus of the current research is the differences between Chinese students studying in the U.S. and Chinese students studying in China on various value dimensions contained in the Chinese Values Survey (CVS) developed by the Chinese Cultural Connection (CCC, 1987).

The validity of the CVS has been examined with factor analysis for both comparisons between cultures (CCC, 1987) and comparisons within cultures (Bond, 1988). This scale was originally designed as a special effort to identify some "culture-free" value dimensions for the purpose of cross-cultural comparison. A 40-item survey was created and administered to 50 male and 50 female college students from a variety of disciplines in 22 countries. Respondents were asked to indicate on a "9-point scale" how important each of the concepts was to them personally; responses ranged from 1 (no importance) to 9 (supreme importance). A culture-level factor analysis (N=22), using the mean of each culture on each item, revealed four factors with 28 items loading above .55 on their respective rotated factors. These factors were labeled Integration, Confucian Work Dynamism, Human-Heartedness, and Moral Discipline. Bond (1988) however, was interested in making individual-level comparisons within cultures and later factor analyzed the same CCC data using individual responses (N=1,386 students in 21 countries) to the 40 items. The scree test (Cattell, 1966) of the eigenvalues resulting from a principal components analysis indicated the presence of two reliable factors accounting for 13.8% of the matrix variance. The two clusters of concepts were labeled Social Integration vs. Cultural Inwardness and Reputation vs. Social Morality.

The review of the prior literature leads to the basic premise of this study: cross-cultural contact brings about value change. Further, the direction and magnitude of the changes in different value dimensions may be varied. Cultural value refers to relation-oriented standards and guidelines for social living. Specifically, the current study utilizes the value items form the CVS.

METHOD

Hypotheses

Three general hypotheses between cultural contact and value changes were generated:

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Hypothesis 1: Chinese students in the U.S. view Chinese cultural values as less important than those students in China.
Hypothesis 2: Chinese students staying longer in the U.S. view Chinese cultural values as less important than do those staying less time in the U.S.
Hypothesis 3: Chinese students in the U.S. tend to keep certain Chinese values that may help them maintain their cultural identity in the new cultural environment.

Measures

Questionnaires were then administered to two samples of Chinese students, one in China and another in the U.S. The sample in China was students from two major national universities (hereafter abbreviated as Chinese Chinese); and the sample of Chinese students in the U.S. was those currently enrolled in a large mid-western state university (hereafter abbreviated as American Chinese). A mail survey was used in the U.S. to distribute self-administered questionnaires. First a list of Chinese students was drawn from the university database and double-checked with the Directory of Chinese Student and Scholar Association. After two mailings to all 124 Chinese students, follow-up telephone calls were made. As a result, 107 out of the 124 Chinese student population responded--a response rate of 86.3%. In the case of Chinese universities, instructors administrated the surveys in their classrooms. Students were informed by their instructors of confidentiality and asked to respond voluntarily. Questionnaires were distributed to 198 students with 185 being returned fully completed, giving a response rate of 93.4%. Furthermore, interviews were conducted among Chinese students in the U.S. for better interpretation of reasons for value changes and cultural meanings of the values.

Survey Participants

Among Chinese Chinese, 91.4% were under 25 years old; only 8.6% were between 25 and 35 years old. Among American Chinese, 7.8% were under 25 years of age, 68% were between 25 and 35, and 23.3% were older than 35 years. In terms of marital status a majority of Chinese Chinese students were single (97.8%). But among American Chinese a majority were married (80.2%). These differences in age and marital status appear to reflect actual differences in the two categories of students. Chinese Chinese students are typically younger

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and single. They enter the university right after high school graduation and are usually not allowed to get married as college students. American Chinese students, however, are basically about five years older because of a very strict rule which requires five years of service in China after graduation from college. With respect to gender there was 33.0% male and 67.0% female Chinese Chinese, and 60.7% male and 39.3% female American Chinese.

In order to gather data from roughly equivalent demographic characteristics between the two samples, a special effort was given to get representation of geographic regions and majors. With these considerations, both selected Chinese universities were national public schools drawing from a fairly diverse population from all over China. Similarly, the Chinese students in the U.S. university represented many regions all across China. Generally speaking, Chinese students who came to the U.S. spoke better English than average in China. Also many of them were majoring in hard sciences. Therefore, one Chinese university was selected for the study which specialized in foreign language studies and the other university selected specialized in hard sciences where the majority of students majored in engineering, computer science, chemistry, and physics. As a result, among Chinese Chinese students, 56.5% were majoring in social sciences and humanities with 43.5% in hard sciences. Among American Chinese, 15.1% were in social sciences and humanities, while 84.9% majored in hard sciences.

Interviewed Participants

In-depth interviews were conducted with 25 American Chinese students (about 20% of the research population in the mid-western university) in order to gain detailed information and value interpretation. The sample of interviewees was selected and stratified to contain appropriate proportions according to age (64% under 35 year old and 36% above 35), marital status (40% single and 60% married), gender (56% male and 44% female), major (32% social sciences and humanity and 68% hard sciences), and number of years in the U.S. (44% under 2 years and 56% over 2 years).

RESULTS

Factor Analysis

The 40-items on the CVS were factor analyzed across the 292 students

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Table 1

Rotated Factor Loadings of Value Items (N=292)

Items	Varimax Rotated Factor Loadings			
	Group Integration	Social Order	Cultural Conservation	Self Protection
Group Integration				
Reciprocation	.59	.12	.01	.23
Trustworthiness	.58	-.08	.02	.09
Courtesy	.57	.13	.20	.11
Harmony with others	.56	.25	-.20	.20
Resist corruption	.55	.05	.15	.03

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Social Order					
Non-competitiveness	-.21	.69	.08	.22	
Contentedness	.05	.67	.08	.18	
Ordering relations	.30	.62	.28	-.08	
Being Conservative	-.07	.57	.23	.54	
Loyalty to superiors	.28	.55	.15	-.04	
Cultural Conservation					
Having few desires	.04	.48	.60	-.02	
Chastity in women	.16	.27	.58	.25	
Cultural superiority	.18	-.08	.68	.17	
Respect for tradition	.14	.22	.67	.08	
Self Protection					
Saving face	.08	.28	.16	.74	
Wealth	.07	-.06	-.20	.68	
Repayment	.09	.01	.22	.63	
Keeping disinterested	.05	.28	.32	.54	

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Table 2

Means, T-Values, and P-Values By Contact on Value Factors (N=292)

Factors	Means: Chinese Chinese (N=185)	Means: American Chinese (N=107)	T-values	P-values
Group Integration	7.46	7.80	-3.07	<0.01**
Social Order	4.95	4.91	0.23	0.41
Cultural Conservation	5.88	5.54	1.78	0.04**
Self Protection	5.22	5.86	-3.59	<0.01**

** $p < 0.05$.

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Table 3

Means, T-Values and P-Values By Years on Value Factors (N=106)

Factors	Means: Under 2 Years (N=47)	Means: Over 2 Years (N=59)	T-values	P-values
Group Integration	7.74	7.85	0.74	0.22
Social Order	4.83	4.84	0.07	0.47
Cultural Conservation	5.83	5.30	1.84	0.03**
Self Protection	6.05	5.71	1.34	0.09

** $p < 0.05$

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using standard procedures (Cattell, 1978). First a Principle Components factor analysis was calculated, and all items failing to load at the .40 level on the first factor extracted were eliminated from further consideration. The remaining 18 items were then factored again and the scree test used to determine the number of factors to retain and subsequently rotate. Since the amounts of explained variation leveled off after four factors, four factors were rotated orthogonally. Items which loaded strong and roughly twice as strong as on any other factor were considered to be loaded on that factor (see Table 1).

As shown in Table 1, Factor I was essentially defined by five items: (1) reciprocation, (2) trustworthiness, (3) courtesy, (4) harmony with others, and (5) resistance to corruption. These five items seemed to reflect a socially cohesive orientation. An integrative relationship is viewed as not only resisting rudeness and confrontation in interpersonal relations but also, and more importantly, requiring a trusting atmosphere whereby a long-term balance of gratification is expected. This factor was therefore labeled Group Integration.

Factor II was also loaded by five items: (1) non-competitiveness, (2) contentedness, (3) ordering relationships, (4) being conservative, and (5) loyalty to superiors. These items seemed to emphasize the importance of keeping oneself in a proper social position for the sake of stability. The factor was labeled Social Order.

Factor III was essentially defined by only four items: (1) having few desires, (2) chastity in women, (3) cultural superiority, and (4) respect for tradition. These items seemed to endorse the reservation of tradition and self constraint and was therefore labeled Cultural Conservation.

The last factor, Factor IV, was also loaded by four items: (1) saving face, (2) wealth, (3) repayment, and (4) keeping oneself disinterested and pure. These items suggested that not only one's spirituality and public integrity but also one's material wealth were appreciated. Together these items reflected a tendency toward protecting oneself and it was labeled Self Protection.

The results of this individual-level factor analysis were somewhat similar to the previous analysis of Bond (1988). Most details of Bond's analysis, however, are not presented (including the criteria for item retention and criteria for items loading on factors). Eleven of the items retained by Bond were also retained in the current analysis; six were

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not. Of the six, only one (tolerance of others) displayed a strong factor loading and was quite important in naming the factors In addition, Bond's analysis generated two factors, but his criteria for items loading on factors is unclear since one item (Chastity in women) was retained on both factors. With the exception of this one item, Bond's second factor and Factor IV presented here were extremely similar. In addition, the items retained on Bond's first factor subdivided across the first three factors in the present study and, as such, probably represent more specific value constructs to explore.

Finally, Cronbach's alpha was also calculated for each of the four factors. The alpha coefficients ranged from .66 to .73 on the factors for the sample. These alphas were all within the accepted levels for inter-item consistency in exploratory studies.

Hypothesis Tests

The hypotheses were established based on the assumption that studying in the U.S. provides Chinese students with the opportunity for cultural contact with Americans and American culture, an opportunity not available to the Chinese students in China. If cultural contact leads to value change, living in another culture should be a direct experience that relates to differences in cultural value scores between the two groups of Chinese students. Furthermore, the longer the Chinese students lived in the US, the more changes were expected in their cultural values.

In order to test the first hypothesis that American Chinese students view Chinese cultural values as less important than Chinese Chinese students, t-tests were calculated on the means of cultural values between countries. The t-test results demonstrated significant differences (.05) on three factors: Group Integration, Self Protection, and Cultural Conservation. No significant difference, however, was revealed on the Social Order dimension (see Table 2). Comparing the means for the three significantly different cultural values, only one direction was correctly predicted, and that was Cultural Conservation. On this dimension Chinese Chinese scored significantly higher (5.88) than American Chinese (5.54). On the other two cultural value dimensions, however, Group Integration and Self Protection, the Chinese Chinese scored lower—opposite to the prediction.

T-tests were also used to test the second hypothesis that American Chinese students staying in the U.S. longer would view Chinese cultural

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values as less important than those with shorter time in the U.S. The statistical analysis demonstrated only one significant difference on cultural conservation dimension – those living in the U.S. more than two years scored lower than those with less than two years in the U.S. (see Table 3). The direction of this significance was consistent with the hypothesis that the longer the Chinese students stayed in the US, the less important the value of cultural conservation became.

T-test results of the third hypothesis can be found in Table 2. This hypothesis predicted that certain values would be maintained by Chinese students in the U.S. for the sack of cultural identity. While there was no change on the value of Social Order, the importance of the other two dimensions of Group Integration and Self Protection increased. On Group Integration the mean for the Chinese Chinese (7.46) was significantly lower than the mean for American Chinese (7.80). Similarly, on Self Protection the mean of Chinese Chinese (5.22) was significantly lower than the American Chinese (5.86).

In order to investigate the possible impact of demographic factors which might effect these differences, t-tests were also conducted within each group on age, marital status, sex, and major. No significant differences were found on any of the four-value dimensions for any of the demographic variable breakdowns. This especially revealed that cultural contact is a much more important factor in value change than any of the other demographic factors. However, as demonstrated above, the value dimensions established through factor analysis were not equally changed or maintained in the cultural process among Chinese students in the U.S. The importance of the dimension of Cultural Conservation among those students decreased through the length of cultural contact while the significance of the dimensions of Group Integration and Self Protection was heightened.

DISCUSSION

To summarize, Chinese students with cross-cultural contact in the U.S. scored significantly different on three of the four cultural value dimensions (on Group Integration, Cultural Conservation, and Self Protection). In addition, length of time spent in the U.S. related significantly to one of the four comparisons (Cultural Conservation). Since the two samples differed greatly on demographic variables, each demographic variable (age, marital status, sec, and major) could be an alternative explanation to contact for the observed differences.

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Consequently, each demographic variable was analyzed separately within the sub-sample of Chinese students in the U.S. for relationships with each of the four cultural values. However, none were found to be significant, ruling out the possibility that differences in cultural values result from differences in age, marital status, sex, or major rather than from the experience in another culture.

As predicted, Chinese students in China scored higher on Cultural Conservation than did Chinese students studying in the U.S. Items included in this factor were having few desires, chastity in women, having a sense of cultural superiority, and respect for tradition. Interviewees pointed out repeatedly that the U.S. was a very materialistic society, much more so that the China they had left, in which values like having few desires was not valued as they were in China. In fact, many suggested that in the U.S. people had many desires and valued having many desires. In addition, they reported that sexuality was glorified in the mass media, with chastity seeming to be out of place. Many also reported that their friends in the U.S. seemed to know very little about tradition or to have any respect for it. They certainly didn't think their culture was superior though they didn't agree that American culture was superior either. Consistently, those who had been in the U.S. for more than two years expressed less concern for these value items than those who had been in the U.S. a shorter time.

The significant differences on the two dimensions of Group Integration and Self Protection were surprising although it was predicted that there would be some values maintained among American Chinese students. On Group Integration, statistical tests revealed that the contact group (American Chinese students) scored higher than the non-contact group (Chinese Chinese students). Items included on this factor were courtesy; harmony with others; reciprocation of greetings, favors, and gifts; trustworthiness; and resistance to corruption. As explained by several interviewees, as long as one resides in the US, value items such as courtesy, harmony with others, reciprocation, and trustworthiness "made a lot of sense in handling casual relationships in everyday life". Most American Chinese students were impressed by the superficial courtesy and harmonious relationships among Americans. They frequently commented on how Americans say "excuse me please" whenever they pass near each other and "thank you" whenever any interaction occurs. When ordering food at McDonald's, for example, they said, Americans frequently excuse themselves several times while

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standing in line to place their order; and then the person placing the order says thank you, the person taking the order says thank you, the person then receiving the food says thank you, and the person handing out the food says thank you again. People in China typically come into much closer contact with each other during their routine daily activities without feeling they have intruded into each other's space inappropriately; and thank yous are reserved for special efforts. Americans also were reported to be quick to "trust" others before knowing them well. The American Chinese informants reported that their American friends might offer them house keys before knowing them very well at all but that they could hardly find friends who would loan them money even after knowing them a long time. By contrast, Chinese need years to build a "trusting" relationship. However, once a relationship is established, it tends to be very deep and durable. Perhaps because of the high mobility in the US, people have to establish relationships quickly; nevertheless, these relationships may be shallow and short-lived. Therefore, the greater endorsement of this value by Chinese students in the U.S. suggests that, on the one hand, a cultural reflection has happened such as trustworthiness; on the other hand, a redefinition of items may have occurred such as courtesy. In the first case, ethnic pride can be encouraged through the process of cultural reflection. However, if the second case holds true, greater attention must be paid to measurement to choose words that have the same meaning in different cultural contexts.

On Self Protection, American Chinese also scored higher than Chinese Chinese. Self Protection items included both material (wealth) and psychological (repayment, keeping oneself disinterested and pure, and saving face) protection. Many interviewees mentioned that they felt insecure in the U.S. because they had left their family and friends at home. Also missing for them in America was the larger socialist system that controlled and yet took care of everybody. Perhaps the sense of insecurity in financial matters, including a very precarious health care situation for them, heightened the Chinese students' appreciation of material resources needed in the U.S. but not stressed or thought much about in the socialist China. The realization of material values is consistent with psychological values, such as saving face. Saving face is to protect one's dignity. When living abroad as an ethnic minority, perhaps saving personal face is used to protect the group's integrity. Most interviewees mentioned that they shared the

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concern that if they do anything wrong, Americans would quickly generalize their individual actions to existing stereotypes and thus make all Chinese lose face. Such an assessment could explain the higher scores on the dimension of Self Protection among American Chinese.

This research was a response to the call for further attention to cross-cultural value studies and increasing cross-cultural interactions between international students and Americans in the U.S. While it was widely thought that differences of cultural values could be found only between or among cultures, this study demonstrates that differences can be found among people of identical country of origin and differs as they with or without contact with outside cultures. The research compared cultural value dimensions based on the value items provided by the Chinese Value Survey (CCC, 1987) and found very similar value dimension patterns. However, some differences were also found on some value dimensions between the current research and that of the CCC. The differences could be attributed to the level of analysis. While the CCC's factor analysis was conducted at a cultural-level, the current study conducted individual-level analysis and compared value differences within a cultural group.

Interestingly, a different pattern on value dimensions was found among Chinese students in Chinese universities compared to in an American university. Some significant value changes were also revealed in the latter group. But there appeared to be no consistent pattern of change across various value dimensions. Perhaps the Chinese students choose to adapt some values as needed to function more effectively in the new host environment while they also tended to hold on to other values in order to maintain cultural identity and psychological stability. At the same time, they may redefine the concepts of some values and give them new meanings in the new cultural context.

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Neanderthalers and Cro-Magnons: A Further Comment

C. B. Goodheart
Gonville and Caius College, Cambridge

Reference the comment by Pearson following my short article entitled *The End of the Neanderthalers*, which appeared in Volume 40 Number 4 of *The Mankind Quarterly,* I would like to clarify one or two matters.

Firstly, I suggested that the forebears of all contemporary *Homo sapiens* derive by common descent from a small group living at a high latitude during the last interglacial when the climate was far from severe, and known to have been a good deal warmer than it is at present. But at the start of the last Ice Age, when it began slowly to get colder, the newly evolved and now naked [furless] *Homo sapiens* moved back in to the tropics again, leaving behind the Neanderthalers, which I regard as advanced and probably still furry *Homo erectus*, in what was indeed now an increasingly "severe northerly environment" round the edge of the ice cap.

Secondly, although I don't doubt that "most contemporary theorists will likely contest [my] view that true sapiens status was attained after migration out of Africa", they ought to think about the fact that emotional facial flushing and blushing, with its complicated sympathetic and parasympathetic nervous control, which must surely have had a sematic function in humans as it does in many other primates, is still found although now invisible in human populations living in the tropics. This suggests that they all derive from ancestors with pale skins, in which the sematic flushing was visible, who must have lived in high latitudes and only secondarily evolved skin pigmentation, in several different ways, for protecting their now naked bodies against the stronger tropical sun. That is one possible explanation of these undoubted observations, and I would challenge "contemporary theorists" to produce a better one.

Finally there is the question of what really is *Homo sapiens* "status" and when, where, why, and how was it achieved. It is generally agreed that the genus *Homo* is first found in Africa, and that what we call *Homo erectus* had appeared there by and probably before the beginning of the Pleistocene. This then evolved various physical features including

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a larger brain, and no doubt more advanced culture, at a slow and steady rate throughout the Pleistocene, until at some stage it was thought to deserve the new name of H. sapiens. But throughout this time only one single biological species was involved, racially polytypic perhaps but fully capable of interbreeding, and when it was to be called H. sapiens was a matter of arbitrary opinion and not of objective biological fact: at no time were there supposed to have been two species of *Homo erectus* living together sympatrically but unable to hybridize.

As Pearson pointed out, however, there is now considerable genetic and other evidence to support the opinion that when, at the end of the Ice Age, the Cro-Magnon *Homo sapiens* people came into contact with the Neanderthalers they did not interbreed. Whether this was because of some Robertsonian chromosome change, as I suggest, is of course pure speculation, but there does seem to have been some genetic bar to hybridization, which suggests that two different biological species were involved. Since there is now only one single *Homo* species, namely *Homo sapiens*, racially polytypic but fully intra-fertile, this means that one of the two, i.e. *Homo erectus*, has been eliminated, presumably by competition with *Homo sapiens*.

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The Continental Cult of St. Alban
(St. Alban and the End of Roman Britain Part III)

Philip Thornhill*
Clapton, London

This paper, which is part of a series dealing with the cult of St. Alban, examines similar cults associated with St. Alban on the European Continent and examines the evidence for their pagan antecedents.

Key Words: St. Alban, St. Albei, Celts, Germans, Greeks, Indo-European paganism, Arians, St. Ambrose, St. Ursus, St. Geryon, St. Germanus, St. Senis, Bishop Theonestus, Dionysus.

I briefly alluded, in Part I of this series of articles dealing with myths surrounding that Saint, to the fact that St. Alban seems to have had quite an extensive cult on the continent. This can be explained, up to a point, as due to the influence of churchmen like St. Germanus, who in all probability introduced the cult to Auxerre.[1]

Its notable presence in Germany might be attributed to the influence of the Anglo-Saxon missionaries, but if so it is slightly curious why the cult did not make a better showing in their homeland. Likewise it is difficult to attribute the spread of the cult to the influence (alone) of Celtic 'peregrini' since the cult barely appears at all in the Celtic homelands, or only in 'disguised form', along the lines we have suggested above. What might be more likely is that the spread of the cult in Europe was to some extent associated with the British 'dispersion' of the fifth and sixth centuries: Fleuriot (1980: 134-58) has shown that the British emigrations extended well beyond Brittany. We have a very good record, for instance, of the British leader Riothamus and his troops in Southern France in the late fifth century (Sidonius *Ep.* II. 9; Jordanes' *Getica* 45). Also this was the period when we know that the cult was very important in Britain and so it may well have been

[1] In his Miracula S. Germani (I.17 in Duru 1864), of the 870s, Heiric describes St Germanus as bringing relics of St Alban from Britain and building a church dedicated to him, in Auxerre: See Picard 1990: 56

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the cult most likely to be disseminated by the Britons of this period in particular. We cannot be sure that the dissemination of the cult goes back to this early period but it seems likely at Auxerre, while elsewhere in Southern France the cult was established as early as the eighth or ninth century (Lowe: 61, 64-5) and at Mainz (where, arguably, the cult represents ultimately that of the British martyr, see further below) it was present from 756, at least (Levison 1941: 338).

However, it is difficult to resist the suspicion that the very extensive continental cult, compared to the rather limited one in Britain, has something to do with what we have noted above in terms of the earlier widespread existence of deities (or semi-deities) with names in 'Alb-', on the continent and throughout the Indo-European world. If our Christian 'martyr', 'Alban', evolved out of a pagan cult figure, 'Albion', or with a name in 'Albio-', we might expect a parallel process to have occurred elsewhere.

With this idea in mind, anyway, we can take a look, for instance, at the distribution of places named after Saint Alban in France. As shown by W.R. Lowe the highest concentration of these is in the Alpine region of Savoy, with a significant concentration, also, in the Rhone valley, and the odd one in the Gironde and Maritime Alps.[2] Lowe suggested this was a reflection of the routes used by travellers from Britain (or Ireland in the case of the Gironde names) to Italy and the Mediterranean. If that is the case it is notable that there are no examples in the Western parts of such routes, such as along the lower Loire or in the Bordeaux region. The concentration in the mountain region of Savoy is particularly striking. In fact two of the places, shown by Lowe here, are not actually named 'St. Alban', but 'Albens' and 'Albanne', the latter of which ('Albinenses' in 116) has been derived from "pré-celtique "alba", collone, forteresse, ville", with the suffix "-ennum" (Dauzat 1963). The local dedication, in both of these places is to St. Alban (apparently the British martyr[3]), but it seems likely that this was a secondary development, inspired by a name in 'Alb-',

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[2] Lowe: especially 60, 62 (maps). But note Dauzat and Rostaing (1963) derive the 'Alban' in Tarn from "nom d'homme Latin 'Albus'"; but also list (p.583) two more St Aubains (< St Alban) : in Drome ('sur l'Ouveze') and in the Maritime Alps ('d'Oze').

[3] Lowe 62 (map), 65-6. In fact the patron of 'Albanne' was was celebrated on 25th July in 1778, later 21st July, the day of Alban of Mainz, see below.

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whether or not the influence of travellers from Britain was also involved. It is not hard to imagine how a name in 'Alb-' might sometimes have become a name, 'St. Alb-(an)', under the influence of a dedication to that saint which it had, itself, attracted, and so it might seem likely that the distribution of such place names, as well as 'Alban' dedications, may to some extent reflect the distribution of toponyms in *alb-* which are particularly common in mountain areas. However it is worth remembering that we have also associated our *albho-* = 'white' words and a high density of 'Alb-' toponyms with Liguria because the other concentration of 'St. Alban' place-names is in the Rhone basin, and South Eastern France in general. We could see this as representing simply a correlation between the distribution of 'pre-Celtic Alba' and that of the 'St. Albain/Aubain' names, but we might suspect that something more than a simple direct influence of the place-names on the spread of the saint's cult is involved given that we have also associated this region with local divinities in 'Alb-'. However, the evidence for the pagan antecedents of the Christian saint is to be more clearly discerned elsewhere.

A cult of St. Alban is also found in Germany and Switzerland: we have noted the existence of the root *alb*, 'white' in the Germanic languages, and its occurrence in Germanic divine and 'spirit' names. Here, though, we seem not to have a cult of the British saint but a different 'Alban': St. Alban of Mainz. It has been suggested that the cult of this saint might have supplanted an earlier one of our British martyr, of which there is perhaps a remnant in a dedication to the latter at Bettbur in Alsace, and which is indicated by the June 22nd date of a festival at the Swiss town of Winterthur (Baker 1938: 253). However Hippolyte Delehaye suggested that the Martyr-saint of Mainz, himself, very probably represents a localised version of the British martyr, as is suggested by his feast date - June 21st, just a day before that of the British one - who, due to an error, actually appears under both dates in early rescensions of the *Martyrologium Hieronymianum* (Levison 1941: 338; Delehaye 1931b: 328, 330).

Further problems of identification are introduced by confusion of both Albans with a St. Albinus, primarily the saint of that name who was a sixth century bishop of Angers: the French 'St. Aubin' (M.Besson in *DHGE* 1696). Thus at Silenen, in German Switzerland, was an 'Ecclesia Sancti Albini Martyris', the martyr in question being the British one according to later tradition, but evidently identified by

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the name appropriate to the French saint (Baker: 250-2). This latter does, in fact, have three dedications in French Switzerland as well as one at Ermatlingen, near Constance, while being traditionally associated with a chapel at 'Garschenna bei Hohenrealta' in the diocese of Chur, where he appears to have been supplanted by St. Alban of Mainz (Baker: 254). On the borders of Savoy, meanwhile, amongst the many 'Alban' place-names is a 'St. Albin de Vaulserre' (with a record of a fete day on the first of March, the day of St. Aubin: Lowe: 63) while in Brittany dedications to the British Alban have been suspected to have replaced original ones to the French saint.[4] In fact we might ask what really lies behind the extensive cult of the French saint and why it has spread so successfully, well beyond Angers. If 'Alb-' toponyms, or related pagan cult traditions, stand behind many of the 'Alban' dedications then by the same logic they might well stand behind some of those to 'Albinus', too (having attracted, in this case the cult of a 'genuine' saint). It would not be surprising, either, in that case, if there was often some confusion and ambiguity over which 'Alb-' cult figure was actually the one celebrated.

The 'Albinus' of Silenen, in fact, had a special connection with another 'Albinus', the one celebrated at Cologne. This 'Albinus' was actually identified with the British martyr, but 'Albinus' seems to have been the name by which he was known at an earlier date. The relics of this saint were said to have been brought from Rome by the Empress Theophano and placed in St. Pantaleon's church in about 984 (Baker: 211): the relics were miraculously saved from destruction in an accident on the way at a place that, in a later version of 1502, was identified as Silenen (Baker: 212, 250). The original record of this was in a twelfth century manuscript where it was alleged that the relics were actually those of the British martyr, having been delivered to Ravenna by Germanus, himself, and taken from there to Rome (Baker 211-13). This is hard to credit and the claim that he was 're-named' 'Albinus' to

[4] Gould: I, 145. Meanwhile 'different' but unverifiable 'Albinus's occurr at Vaison near Avignon (J.Sautel, *DHGE* 1695) as 'first bishop'; at Embrun in the French Alps (P.Fournier, *DHGE* 1696; Wasselynk in *BS* I,724) as an early bishop; at St Martin de Champs, Paris (H.Quentin, *DHGE* 1698) as a 'martyr'; at 'Saint-Pons de Thomieres' (Quentin, 1701). These might be seen as parallel to the apparently 'different' but unverifiable 'Alban's, as at Mainz, Basle, etc: they (or some of them) might likewise represent manifestations of a traditional local cult-figure in 'Alb-'.

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avoid confusion with the martyr of Mainz looks like an attempt to resolve the difficulty of the difference of name with the British martyr so that the Cologne church could claim to have the relics of that prestigious figure. It has been very credibly suggested that the relics actually came from the catacombs of Rome and had been interpreted as those of an Albinus on the basis of some inscription, found there (Baker: 215-6). However it might be worth at least bearing in mind, in this context, the likely importance of 'Alb-' in the early religion of Latium ('Albula', 'Mons Albanus' etc..): we might consider whether there might not have been, here, some kind of surviving tradition of a cult-figure in 'Alb-' that resurfaced in Christianised form, producing (yet another ?) spurious 'martyr-saint', for whom relics could no doubt have been 'discovered'.

It might also be worth considering whether there might have been some special reason for bringing the relics of a saint, so named, to Cologne: whether there might have already been some kind of indigenous tradition of an 'Alb-' cult figure at Cologne, in fact, which had some influence, here. It is worth noting that another church at Cologne is known to have been dedicated to the British Alban from the twelfth century (Baker: 338), while it might be no coincidence that an Alban was celebrated at two further locations on the Rhine, at Mainz and Basle. Both of these are from an early date, since the latter is recorded in the Berne rescension of the *Martyrologium Hieronymianum* of circa 800: "Basilea civitate sancti Albani martyris", where he would appear to be an independent local (or early localised ?) figure, being celebrated on the twenty fourth of August, although later identified with the saint of Mainz (Baker: 254; G.Allmang in *DHGE* 1366; G.B. Villiger in *BS* 655).

If all these derive from the cult of our British martyr - and the fact that all these 'St. Albans' (or 'Albinus's) are characterised as martyrs is significant - then their location along this river might be a reflection of the fact that it was a highway into Europe from South East England. However we might suspect that there is something more to it than that. The particular, divergent, form 'Albinus' might suggest an independent development from an indigenous cult figure in 'Alb-' (if it does not represent the influence of an Italian 'Albinus' with whom the local figure was identified, or a need, at some stage, for a local cult figure manifestly independent of the one of Mainz). More important, though, is the fact that the Albanus of Mainz, while showing the influence of

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the British cult in his feast date (and in the precise form of his name as well as in the tradition of his martyrdom ?) nevertheless has a strong independent tradition (see below), even if that is not one we can take at face value. I have noted elsewhere (Thornhill: 497-500) that the name of the other martyr of Mainz, a bishop 'Aureus', echoes that of the 'Aurei', the saints of Cologne mentioned by Gregory of Tours, and suggested that both of these might be associated with a hydronym *ar(a)* (> *aurea*, by a false Latinisation probably attested elsewhere) that is found in the names of tributaries of the Rhine and might even have been associated with that river, itself.

It might be, then, that these cults have some roots in the local, ultimately pre-Christian cult traditions, of this region, itself. Parallel to the suggested association of 'Aurea' and the 'Aurei' with the Rhine it might be that there is some connection between the fact that these 'St. Albans' are found along the Rhine and the fact that the element 'Alb-' frequently featured as a hydronym. It is worth remembering at this point that Pomponius Mela's mythical 'Albionus' was associated with the region of the delta of a major river, the 'Rhone'.[5]

Of course it would have been easier to advance a theory along these lines, linking our 'Alban' cults with the hydronym *alb-*, if we had been dealing with the 'Elbe', say, or the 'Aube', rather than the Rhine, but nevertheless it remains possible that there was some link between the Rhine and a name in 'Alb-', either as one of the (many?) 'by-names' of the river, itself, or perhaps the title (or one of the titles) of an associated deity. We can bare in mind that the root *alb-* is found in the Germanic languages not only as a river-name but also as implying an association with 'rivers', in general. There are also two names in 'Alb-': 'Albaniana colonia' (Alfen) and 'coloniae Albiola (Batavorum)', recorded from the Rhine delta (though therefore also

[5] There is, furthermore, another correlation between cult-figures along the Rhine and the legends with which this 'Albionus' was associated. In these (as we have seen) Albionus was an opponent of Hercules, but Hercules's most famous opponent (in related legends) was 'Geryon'. An important martyr-saint of Cologne, associated, almost certainly spuriously, with the 'Theban Legion', was a 'St Geryon', first attested in the *Martyrologium Hieronymianum* as re-compiled at the end of the sixth century (Attwater: IV, 78-7; Delehaye 1931: 9th Oct, cf. Duchesne 1894: 130; *ASS* Oct. V. 14-60, with 13th c. Passio). The Geryon of the legend undoubtably represents a pagan cult-figure and the possibility must exist that the Christian 'saint' had a similar origin.

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opposite Britain = Albion),[6] as well as the place name in 'Alb-' associated with the 'Albiahenae' (now Ober-Elfenich) further upstream.

In this context it is worth referring back to the tradition associated with our British martyr. This demonstrates the miraculous power of the martyr over water, in his creation of a spring and in the way the river parts for him on his way to execution as well as in his ability to safeguard the sea-voyage of St. Germanus. These are hagiographical commonplaces, certainly, but what has long attracted interest is the rather curious fact that Gildas identifies the river that parts for the martyr as the Thames (*De Excidio* 11), when it should be the 'Ver' at Verulamium, as it appears to be in the continental passios. This could be explained by pure geographical ignorance on the part of Gildas, or by an ultimate origin of the cult actually in London, or elsewhere on the Thames, before it became established in Verulamium, at some stage prior to the time of Gildas and the writing of the earliest Passio (cf. Sims-Williams 1983: 6, note 25). It is important that this latter hypothesis need not conflict with our theory (except that it might imply that London, say, was the earlier dominant centre, with Verulamium taking on this role only later) but we might, nevertheless, add the further hypothesis that there might, anyway, have been some special link between our cult-figure and the Thames that influenced the tradition known to Gildas - parallel, conceivably, to that between our continental 'Alban's and the Rhine, but with the possible added factor, here, that the Thames might have been the one river most closely identified with the island of Britain or 'insula Albionum', as a whole.

We can return at this point to St. Alban of Mainz. We have noted above, that a name in 'Alb-'= 'white' might be an alternative to names of similar meaning like 'Loucetios', and, in fact we have suggested that a name closely related to this one, 'Lóchan' (> *leuk* + *an*) was a by-form for Ailbe < Albios. It is worth noting in this light, that a 'Mars Loucetios' (with a consort 'Nemetona', presumably especially associated with the local tribe of the 'Nemetae') was an important god of the Treveri in the Rhine/Moselle region and his cult is, indeed, recorded from 'Moguntiacum', Mainz (Green 1986: 37, 11,

[6] Whatmough §22. Also a conceivably related but doubtfully recorded (De Vries § 414, note 3) divine name 'Alabuandus'.

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155; Ross 1992: 207, 228-9, 257, 271). This gives us a possible pagan antecedent for our Christian cult-figure but more important in this respect is that independent tradition associated with the Mainz St. Alban that we alluded to above.

The saint's legend[7] concentrates on his conflict with the 'Arians' but it is not impossible that the 'Arians', here, represent another 'spin-off' from the *ar(a)-* hydronym which we have suggested is associated with the other bishop-martyr of Mainz, 'Aureus'. It might have provided the germ for this story which gave the martyr a heroic role, plausibly linked to the genuine one of other Gaulish saints (who sided with Athanasius against the Arians or resisted the Visigoths), fighting against the enemies of the true faith. This would have led logically on to his association with St. Ambrose at Milan (famous for his resistance to the Arians), which also features in the legend. Less easy to explain is his particular association with the martyrs 'Ursus' and 'Theonestus' and his supposed origin in the Greek island of Naxos, that all feature in our earliest brief account of the martyr's life in Raban Maur's martyrology of the early ninth century.

Ursus was said to have been martyred at Aosta and it is difficult to accept the fact that a 'St. Ursus' was later associated with this place (*ASS* February I, 97-99, 945-8; Agostino Amore in *BS*, 1246-7), as pure coincidence. This has been said to be the case because this latter 'Ursus' was recorded as a 'hermit', not a martyr. It seems much more likely that we have a case, here, of confused tradition, about the same figure: in a later reference (from 1633: *ASS* Feb I, p.99) he is even acquiring the character of a bishop. If this is the case then it might cast doubt on the whole tradition associated with this 'saint', even including his historical existence. The Life of St. Ursus of Aosta attributes to the saint a miraculous power over the two local rivers that enables him to save his church from flooding (c. 4 of *Vita, ASS* 945-8). This becomes more interesting by comparison with a more famous saint with the same name, the Ursus of Soluthurn in Switzerland, identified as a member of the 'Theban Legion' and said to have been martyred together with

[7] In sources from Raban Maur's martyrology (early 9th c., in Migne, *Patrologia Latina* 110, saec IX, 1154) onwards, especially a Life by Gozwin of 1060-2. See Attwater II, 608; *ASS* June V, 75-83; Allmang in *DHGE* 1365.

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one 'Victor'.[8] The legend associated with these two demonstrates their power over fire and water: after failing to burn them their evil persecutor has their beheaded bodies thrown off a bridge into the river but the saints emerge from the water holding their heads in their hands ! (c. 3-4 of their *Passio* in *ASS*, 291-3) This is highly suggestive of the Celtic cult of the severed head, whilst also suggesting that these figures were associated with a pagan cult, connected with the river.

The Aosta Ursus, meanwhile, was reputed to be of Irish provenance ('Natione Scotus'): this might have been suggested by the 'Celtic' associations of his tradition if he represents a Christianised, local, pagan-Celtic deity, as we have suspected is the case with the Soluthurn 'Ursus'. The old pagan-Celtic traditions of the country-folk may have been 'Christianised' (perhaps even with the involvement of genuine Irish 'peregrini') in a way parallel to that by which pagan cults were Christianised in Ireland: so that the two may have been associated together, to some degree. We can compare, anyway, another homonym (or near-homonym) of one of the Soluthurn martyrs, namely 'Victurnianus' of the Limousin, in Aquitaine, who was also said to have been Irish : - and in this case, is rather more convincingly associated with the Soluthurn martyrs, by his feast date (*ASS* September VIII, 689-91).

There is, finally, at least a theoretical explanation for a link between the name 'Ursus' and 'water'. This involves, once more, a hydronym : pre-Indo-European *ur*,[9] which might, conceivably, have become assimilated to 'Ur-sus' (of entirely different, Indo-European, etymology) in a cult-context, (whether or not the meaning of 'Ursus' as 'bear' might have had any influence on its cult-suitability, as well). Neither of the rivers primarily involved, it is true, actually has a name, 'Ur-' but both have pre-Celtic, perhaps pre-Indo-European names,[10] and one of them included the element '-ur-' in one recorded version:

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[8] Attwater: III, 619-21; ASS September VIII, 261-93. They are mentioned in the earliest surviving account of the 'Theban Legion' by St Eucherius of Lyons in the mid fifth c. : "Ex haec eadem legione fuisse dicuntur etiam illi martyres Ursus et Victor, quod Salodurumpassos fama confirmat" : Krusch, *MGH, SRM*, III, 20-41 at 38, c.14.

[9] Holder II, 34; Bertoldi 1931: 100; Dauzat 1978: 91, 227-8 : " pré-indo-eur. *'ur'. apparenté à basq. 'ur'"

[10] Aosta is on the 'Dora Baltea', earlier 'Doria' or 'Duria' (Holder I, 1379) which Dauzat 1978: 40 derives from "Dora, rad. hydron. pré-celtique (dor-, dur-)".

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the 'Aar', at Soluthurn, was recorded under the name 'Arar' but also, probably, 'Ar-URa' (Holder I, 230). It would appear, moreover, from these two versions of the name that '-ur' might in some way have been seen as equivalent to '-ar', so that Albanus's association with 'Ursus' would, in a sense match his association (at Mainz) with 'Aureus': with the hydronym *ur* standing behind the former as the hydronym *ar* does (so I have suggested above) behind the latter.

Another point worth noting is that there was another St. Ursus - or Ursius - closer to Altino (where Theonestus was said to have been martyred) and Burano (see below), at Vicenza (recorded from 1147: Irene Daniele in *BS* 863-5), whose legend (recorded 1493) consisted of a version of the story most closely associated with Julian the Hospitaller, in which the saint accidentally kills his parents (cf. Thornhill: 496 with note 43). A version of this story is also found attached to a legendary (and almost certainly fabulous) St. Alban, king of Hungary (Filippo Caraffa, *BS* 661). The legend is well known to originate in pagan solar myth and while that does not prove that these cults (and the names of the cult-figures) also have pagan origins it is certainly a fact entirely compatible with that hypothesis.

Next there is the question of the supposed origin of Alban in Naxos and his other alleged companion, 'Theonestus' (Antonio Niere, *BS* 354-8; *ASS* Oct XIII 335-48). The two might seem to be linked since the version of the story in the tenth century Passio (*ASS*, 347-8) of Theonestus describes that saint as a bishop who came from Naxos with his 'disciples', Alban, Ursus, Tabra and Tabratha. The second, eleventh century Passio (*ASS* 345-6), however, describes him as bishop of the Macedonian city of Philippi. In this case he has evidently been identified with a genuine Theonestus, a bishop of Philippi who attended a council at Carthage in 670, but who cannot have been the companion of our Albanus having evidently been alive at the wrong time and not having been attested as a martyr. Another historical figure who might be relevant is a bishop 'Theomastus' associated with Mainz (*BS* 356; Gregory of Tours, *Glory of the Confessors* 60-1): confusion between his name and that of Theonestus might have aided the association of the latter with that place and so, also, Alban - although given the presence of a cult of Alban at Burano near Altino (Theonestus's reputed place of martyrdom) it might seem likely that the two were first connected together in this region (see below). In any case much about the legend remains unexplained.

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One thing we can note about the martyr's name is that it seems to contain the Macedonian river-name, 'Nestos' (and so is unsurprising as a name for someone from nearby Phillipi), and indeed, might, be interpreted as 'the god of the Nestos', or similar. It is interesting, therefore, that the hagiography represents Theonestus not only as martyred over a river - on the bridge, at Altino,[11] over the Sile, with fellow martyrs, 'Tabra' and 'Tabratha' - but also as having a special power over water, being able to keep miraculously afloat in a leaking boat (*ASS* Oct XIII, 345-6; cf. the miracle of Ailbe, *Vita* c.4). An association with water and rivers, anyway, is something else that might help to account for his partnership with 'Albanus', who would have similar associations, on our hypothesis.

Another thing that would seem to connect them is an association with the Greek island of Naxos. It is interesting that although our earliest version of the tale in Raban Maur's martyrology would seem to link Alban primarily with this place the first Passio of Theonestus would seem to suggest, rather, that the primary link of this place was with Theonestus, who is the bishop while Alban and the others are merely his disciples. In ancient times the cult figure most closely associated with Naxos was Dionysus (e.g. Farnell 1977: V,135). It is tempting to see in the name 'Theonestus', some kind of distorted mirror image of the name, 'Dionysus'. It may or may not be relevant that the cult of the latter (or that of a figure equated with him) was also important in Thrace and Macedonia and possibly even originated there (e.g. Farnell 1977: V, 88ff.): it is not, anyway, possible to establish any connection between the 'Nestos' (otherwise 'Nesos') and the mythical 'Nyssa', associated with Dionysus.[12] Nevertheless it might be that there has been some kind of conflation of a cult of Theonestus (as a genuine bishop) with that of a surviving one of Dionysus: and that this lies behind the presence of a cult of "Theonestus" at both Altino and Vercelli, in Italy. He would then represent in these places a 'disguised', Christianised, successor to the pagan Dionysus; as

[11] Theonestus had a church at Mainz from Carolingian times (*BS* 356) but his cult is recorded from the area of Burano from 710: *BS* 356.

[12] Generally thought to be somewhere exotic like Arabia, though Diodorus Siculus (III, 65) links Dionysus with a 'Nysium' in Thrace.

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identified, in all probability, with originally local cult figures.[13] The fact that the 'Theonestus' of Vercelli is represented as a separate figure - although, significantly also a martyr - need not imply anything more than a 'localised' version of the cult, at this place (Ercole Crovella in *BS* 358-9). Interestingly there is an unverifiable record of a bishop 'Albinus' at Vercelli and some kind of confusion or perceived association of this figure with an 'Albanus' might be implied by his legendary (and erroneous) association with a visit to Vercelli of St. Germanus of Auxerre, while his festival date is shared by Albanus of Sora (Quentin, *DHGE* 1701; Crovella, *BS* 726-7).

It is worth noting that the story of the tearing to pieces of Dionysus might readily have lent itself to assimilation to a legend of 'martyrdom' while his 'resurrection' might have made his myth readily assimilable to parallel themes in Christianity. There is, meanwhile, another, more obvious, candidate, amongst reputed Christian martyrs to have an origin in Dionysus: the martyr, St. Denis, or 'Dionysius', of Paris.[14] It is important that some of the evidence in this case might also support such a hypothesis: in his 8th c. Life the plan to throw the beheaded bodies of himself and his fellow martyrs into the Seine (cc. 25-6 in Krusch, *MGH, SRM* IV, 2, 101-5) is reminiscent of the fate of Ursus and Victor (see above), while the fact that the secret burial of their bodies causes a miraculously high agricultural yield in the area might suggest an association with vegetation and fertility, that would be appropriate to a cult of a localised Dionysus. More pertinently Dionysus's fellow martyrs were said to have been 'Eleutherius' and 'Rusticus' (first in *Mart. H.*, end of 6th c.): the former was an epithet for Dionysus (Pausanius I, 20.2; Diodorus Siculus IV.2) while the latter could easily have been, too, especially in the context of a cult associated with agriculture and (judging by the *Vita Genovefa*) centred outside the city at the 'Catulacensum vicum'. This all suggests the survival of a

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[13] For the spread of his 'mystery cult' throughout the Roman Empire Turcan 1996: 291-327. Turcan notes the general decline of Oriental cults, in the face of Christianity from c. 200, but does not extend this to include "rural paganism... 'naturist' and neolithic religion" (pp.328-9) so it may well be that the former stood their best chance of survival when assimilated to the latter: hence the association with local rivers etc....

[14] His cult is recoded from the 6th c. : *Vita Genovefa* cc. 17-19 (in Krusch, *MGH, SRM* III, 204-38 at 221-2). See Attwater I, 28-30; Gregory of Tours: *History of the Franks* I, 30; *Glory of the Martyrs* 71.

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localised cult of Dionysus (or local god assimilated to Dionysus) in Christianised form: at the very least if there was a genuine martyr 'Dionysius', then the cult associations inherent in his name have much to do with the success of his cult.

So where does Alban fit in here? We have suggested, above that Dionysus, as his cult spread through the Empire, will have been identified, in all probability with local cult figures: might it be that some of these had names in 'Alb-', or even that there was some rather special connection between Dionysus and an earlier cult figure in *alb-*? Our 'saint' Alban will then have been associated with Naxos in Greece, as a result of his association with Dionysus = Theonestus. We might, on this general basis, anyway, have some kind of explanation for the association, together, of Theonestus, Alban, and the isle of Naxos: something which is otherwise notably lacking.

It is true that the association of Alban with Theonestus seems likely to bear some relation to the presence of a cult of a saint 'Alban', at Burano, near Altino, the location of the supposed martyrdom of 'Theonestus' (whose cult is recorded at nearby Treviso from 710). This geographical proximity of the cults is not enough, alone, to account for the association in legend, even if it was 'this' Alban who was first linked with Theonestus. Alban had a more immediate local connection, actually at Burano, with one 'Domenicus': so it will have had to have been something else that linked him to Theonestus, in a context that was not purely local. Furthermore, in records from the fifteenth century, the bodies of Albanus and Domenicus were said to have arrived miraculously by sea in a stone chest (*ASS* June V, 80-3; Daniele, *BS* I , 721), in a legend reminiscent of that of St. Liberio of Ancona (Mario Natalucci, BS 24-5; *ASS* May VI, 720-22). This legend is also reminiscent of one of the stories told about Dionysus[15] while the saint of Ancona shares the name of the Italian god of fertility, 'Liber Pater', who was commonly identified with Dionysus (Turcan: 304, 325). Furthermore, he seems to echo the legendary Eastern adventures of that god in his late Life. It is tempting, therefore, to suspect that both 'Liberio' and 'Domenicus', here, represent

[15] Dionysus, with his dead mother Semele was said to have been washed up in a chest at Brasiai in Greece (Pausanius III, 24.3); cf. the Perseus myth (e.g. Apollodorus II.4.1) and its Celtic analogues (e.g. Gruffydd, *Math*, p.374).

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ultimately 'Dionysus': the latter a 'disguised' form (and/or 'epithet'?), parallel to 'Theonestus'. In fact it is this emerging broader pattern of associations that makes the original theory more convincing. That this Alban, anyway, was identified with the one of Mainz is suggested by his late association with an 'Ursus', which must surely reflect the influence of the legend of the Mainz Alban.

It might also be significant that this Alban's cult is located on an island (of Burano) in the bay of Venice; comparable, to the island of Naxos, the island of Britain, and, indeed, the legendary island of St. Ailbe: perhaps just a coincidence, but not if the *alb(io)*- element was typically applied to island-names and/or the divinities associated with them. There are parallels of other toponymic elements that are applied to rivers, hills or mountains, and also islands - and to the associated deities of all of these, as well (cf. Part I, above, with note 23; Thornhill: 493; this will also be an important consideration in our discussion of the ultimate origin of the toponym *alb*-, in Part IV, below).

The fundamental point, here, of course, is that if the 'Alban's of Mainz, and elsewhere, can be seen to represent an ultimately pagan cult figure, then we have a very pertinent parallel for what we have hypothesised for the British Alban. It is easy to understand, on this basis, as well, why the various Albans might sometimes have been identified together (as the Mainz one was with the British one at some stage, on the evidence of his feast date) and sometimes have taken on a purely local character, rather as the old pagan gods had.

Meanwhile as regards our hypothesised link between Dionysus and cult figures in 'Alb-', we might find some hints of it in Greece, itself. The many and diverse associations of Dionysus might suggest he was associated with, or absorbed the traditions of, several pre-existent deities and it may be that one of these bore a name in Αλφ- . We have noted that this element was found in the river and divine name, , and a direct connection between this and Dionysus does exist since the first Homeric Hymn (1-4) records that the 'Alpheios' was one of the traditional birth-places of Dionysus.

We have also briefly noted above the record of an Αλφιτω, a female 'bogey-person', or 'nursery bugbear', but who might represent a survival from a very ancient strata of Greek theonyms (so comparable, in this way, to the 'Alb-' names of Latium). Her name is evidently connected with αλφι, 'barley-bread' (Chantraine: 67; Pokorny: 29; Graves 1948: 67, 366, 434; 1955: 22.g.2, 52.7), and on this basis she has

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been associated with the 'corn-goddess', 'Demeter', or her double 'Persephone', both of whom figure as the mother of Dionysus (usually 'Semele') in the differing traditions (Diodorus Siculus III. 62,64,74, IV.4, V.75; Graves: 14.b; cf. Farnell 1977: V, 245-8): the particular association of this god with the vine has undoubtedly evolved from a more general one with vegetation and agricultural productivity. Alphito's divine status, however, need not have been purely a factor of her association with corn: as 'bogey-person' she brings to mind the connotations of Germanic *alp-/elv*. As we have suggested in other cases, this divinity may represent a quite deep rooted tradition of theonyms in *albho-*/ αλφ, even if that is not immediately obvious: a quite long and complex process of interaction between the theonym and words for 'white' and 'whitish grain', may lay behind the form of the theonym, as it has come down to us. An early deity associated with vegetation and fertility, meanwhile, may quite credibly have been supplanted by (or become closely associated with) Dionysus: the first element of whose name is the archetypal Indo-European theonym *dyew-*, with a literal meaning, 'bright, light', comparable to that of *albho-*/αλφ-.

Of course a link between solar/sky deities and the fertility of vegetation would not be unusual and in this context the ability of saint Ailbe to promote fruitfulness (*Vita Albei* 9-12) is relevant, while his association with a 'fruiting vine', in the context of his visit to the 'Otherworld ship' and final death (*Vita Albei* 42) might suggest a more direct comparison with Dionysus. Then again, there is the fact that, in the *Vita Severi* (c.2; see Part I, note 13), the cult of St. Alban succeeds to the cult of a sacred tree, his basilica being built on the site, which is something that might bring specifically to mind 'Dionysos of the Tree', as admirably described by Frazer (XLIII, XLIX).

While the mother of Dionysus was sometimes the 'corn', or 'vegetation', goddess his 'foster-mother' was one 'Ino' (*Odyssey* V.333; Apollodorus II.4.3; Graves 1955: 70.g,h), evidently another 'vegetation goddess' (so Farnell 1921: 35-47). 'Foster-parents' might represent an attempt to reconcile different traditions of parentage, which might, in turn, derive from the actual succession of one cult to another, or perhaps have reference to some primal relationship between the female and male elements of a fertility, or vegetation, deity. 'Ino' was otherwise 'Leucothea', probably 'White Goddess', and this name is another one which incorporates a word meaning 'white, light'. In this context it might suggest itself as derivative by 'translation' from a name

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in *albho-*/*αλφ-*[16] (compare what we suggested for 'Loucetius' and 'Lóchan', above), while Leucothea's role as protectress of seafarers would link up with our 'Alb-' cult-figures' hypothesised association with 'water', and with the role of the British St. Alban in guaranteeing the safe sea-journey of Germanus, especially.

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ABBREVIATIONS

BS *Bibliotheca Sanctorum*, Istituto Giovanni XXIII, Pontificale Universate Lateranense.

DHGE *Dictionnaire d'Histoire et de Geographie Ecclesiastique*, ed A. Baudrillart, Paris 1912.

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[16] Or perhaps just al-: see further Part IV, below.

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BOOK REVIEW ARTICLE

The Biological Basis of Aging and Death

Edward M. Miller[1]
University of New Orleans
New Orleans, LA 70148

A Means to an End:
The Biological Basis of Aging and Death
William Clark
Oxford University Press

A Means to an End: The Biological Basis of Aging and Death by William Clark deals with senescence, the process by which our vulnerability to disease and death increases steadily with age.

One chapter discusses the evolutionary basis for differences in lifespan. We may be tempted to say that naturally living organisms wear out, as do machines, and we should not be surprised when tissues grow old and fail to function. However, this process for similar tissues occurs at quite different rates. At the microscopic and biochemical level, the cellular processes in a mouse and a human are quite similar. Yet the maximum lifespan of a mouse is only 3.5 years while for a human it is 122 years. Clearly, the tissues of some species are engineered to function longer than those of other animals. Why do different species have such different lifespans?

Clark points out that part of it seems related to the age of reproduction. Animals whose function declines before reproduction would be out reproduced by animals whose bodies lasted longer. What has prevented human bodies from evolving to last longer is that most of us have finished rearing our young by the time really serious deterioration has set in (say age 65). While we would like to live longer, living into retirement age contributes little to the number of descendants we leave. Thus, if the price of this living longer is fewer

[1] Research Professor of Economics and Finance, University of New Orleans, New Orleans, LA 70148. Telephone 504-280-6913 (work); 504-283-3536 (home); 504-280-6397 (fax); Emmiller@uno.edu (E-Mail)

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children born at younger ages, there is likely to be selection against the genes for body maintenance.

While Clark argues that we have genes for senescence (as well as genes that retard it), he never is quite clear on why those that delay senescence (and hence have a longer reproductive life) do not out reproduce those experiencing earlier senescence. The missing detail is that delaying senescence probably has costs (possibly from diverting energy to cell maintenance and repair). Individuals that divert resources from bodily maintenance can use these resources to avoid being eaten, to fight parasites, or to find mates. The individuals that leave the most descendants accept a shorter lifetime in exchange for other benefits that contribute to leaving descendants. Arking (1998) provides a better discussion of theories of aging.

That an organism's length of life can evolve in response to selection for early or late reproduction has been shown in several experiments. When each succeeding generation of fruit flies was grown from eggs laid late in the life of the fly, the lifespan of fruit flies was increased.

In Trinidad, it was found that guppies from the lower pools reproduced earlier and had a shorter lifespan than those from the upper pools. In the lower (further down the river) pools the main predator ate guppies of reproductive age. In the upper pools the main predator ate immature guppies. In the later case, once a guppy had survived to reproductive age it would leave more offspring if its body survived longer. Thus, the guppies had evolved to live longer. When breeding stock from the pools where lifetime was short were introduced into pools where the predators neglected the older fish, the guppies evolved towards an older lifespan. Finally, when predators that went after the older fish were introduced into the pools with the originally short lived upper pool stock, these guppies evolved shorter lifespans.

Thus, it appears that in these two species at least, and probably in other species, including humans, the gene pool contains genes for a longer life span. In human populations (races) evolving in different circumstances, lifespans could be different. Miller (1994) has argued that in climates where male provisioning of the young is necessary for children to survive, selection for a long life has been stronger than in tropical areas.

The evolutionary mechanism that produces the correlation between lifespan and age of reproduction could also operate within humans. This inspires some speculations that are mine, not Clark's. Several

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studies suggest a correlation between socio-economic status and lifespan. In recent generations, the start of reproduction has been later is the higher socio-economic classes. This would produce selection for longer lives. Socioeconomic status is also a surrogate for intelligence. Especially interesting is the Whitehall study in which the mortality rates were found to decrease steadily as one ascended the ranks of the British Civil Service. This was puzzling since all subjects had basically sedentary desk jobs with the same medical care (the British National Health Service). Peak earnings in jobs that involve brain power occurs later than in jobs that require merely muscles. This is probably because experience (and education) results in higher earnings for brain power jobs, while a similar effect is not found in muscle power oriented jobs. Because higher earnings provide a better choice of mates for males, reproduction appears to have started later in those that earned a living by their brains for many generations. This may have gone on long enough for natural selection to have caused the genes for longer life to be concentrated in those also carrying the genes for intelligence. Some evidence that the intellectual classes have been preferentially marrying within themselves for many generations is provided by Weyl's (1990) finding that people with the last name Clark (derived from medieval people who were clerks) are over represented among lists of successful Americans.

Clark's primary message is that the body must contain a relatively small number of genes that produce senescence as well as genes that retard it.

The argument that there are only a few genes that contribute to senescence comes from the existence of a small number of rare genetic diseases characterized by the early appearance of characteristics of the aged. While rare, these are scientifically interesting because they may help unravel the causes of normal aging. These diseases affect a large number of different types of tissues in the body. Clark argues that the defects that produce these diseases must be in housekeeping genes that carry out the same functions in all cells. In this way a single gene defect can produce symptoms that look like accelerated aging in many different tissues.

Werner's syndrome is one such disease. Victims have a generally aged appearance, early gray hair, and early cataracts, cancer and diabetes. When removed from the body their fibroblasts show a number of divisions that is much less than in non-diseased individuals of the

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same age. The symptoms resemble accelerated aging in many different tissues. Werner's syndrome has been recently been found to be caused by a defective helicase gene. This gene is believed to play a role in the repair of genetic damage.

Several highly technical chapters discuss the cell cycle and how the reproduction of the cell is regulated. A single cell growing when it is not supposed to can produce a cancer that kills the whole body. A fascinating chapter deals with number of divisions a cell removed from the body can undergo before it stops growing. This number of divisions is called the Hayflick limit, after its discoverer. It is greatest for cells removed from embryos and least in those removed from the old. It appears greater in long lived species than in short lived species. It is also reduced in several of the progeria, or diseases of aging. Thus, it appears that this limit on cell replication somehow reflects the cellular processes that cause aging, even though most of the cells that under aging in the body do not divide in adulthood. The hope is that if many of the problems of aging can be traced to the actions (or lack of action) of a small number of genes, it may some day be possible to slow down aging.

So far only one process has been found to slow down mammalian senescence. This is caloric restriction. When rodents (and various other experimental animals) are fed much less than they would normally eat in laboratory conditions (i.e. with food readily available), they live substantially longer than laboratory animals normally do. For instance, in one study rats were fed from weaning on only 40% of the calories unrestricted rats received. At maturity they weighed only a third as much as the other rats, but they lived almost twice as long. If the caloric restriction is started in adulthood, the effect is less striking, but still significant. Most of the aging processes in rodents are slowed down by such caloric restrictions. In particular, cells removed from such calorie deprived rodents will undergo more divisions than cells from non-caloric deprived animals.

Unfortunately, it is not known whether this would work in humans. Experiments are now underway to see if caloric restriction works in monkeys, which are closer to humans than rodents are. So far, the monkeys have reached the age where normally fed monkey would be developing diabetes, and diabetes has not yet appeared. It looks as if calorie restriction does indeed slow aging in monkeys.

It would be very interesting to know if this would work in humans.

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Clark leaves the question open, but one researcher on caloric restriction, Walford has argued it should work in humans and written a popular book (Walford 2000) and a professional book (Weidruch and Walford, 1988) suggesting adoption of such very low calorie diets for humans.

A natural question is why caloric restriction prolongs lifespan. Clark, like other experts, suspects it is because restricting calories reduces the amount of oxygen used by the cell, and hence the amount of reactive oxygen species produced. These are believed to damage cells in various ways, including oxidizing the lipids in cell membranes, and damaging the DNA in the cells. Cells have developed various mechanisms for reducing such damages, typically through various antioxidants. Both vitamin C and vitamin E are antioxidants. There is considerable evidence that these reduce oxidation damage.

This is not a manual for improving health and Clark does not make recommendations. However, his summary of the evidence on cancer and heart disease suggests that some benefits would be derived from taking such anti-oxidants and he notes that "Reducing mortality from heart disease and cancer would be expected to have at least a modest effect on average lifespan".

The senescence that people fear most is that of the brain. Clark devotes a chapter to brain senescence, with an emphasis on Alzheimer's. Oxidative damage apparently plays a role in brain senescence. Oxidized proteins increase in the brains of aged gerbils. Gerbils maintained on an anti-oxidant made the same number of errors (four) on a maze test as young gerbils did, an error rate that is half that of old gerbils (eight errors). The same antioxidant worked on a senescence-accelerated strain of mice.

Of course, other authors, especially those writing popular books, are less cautious, and argue for taking supplements of various antioxidants (see for instance Carper, 2000; Papas, 1999). It should be realized that whether a particular treatment extends life in humans or other animals is logically distinct from the question of whether one should use that treatment in an effort to extend life. The latter decision depends on whether the estimated benefits exceed the estimated costs. If the benefits are potentially large (a few more years of life) and the costs small (say expending a few dollars on supplements, or changing eating behavior), the expected (in a statistical sense) benefits could exceed the costs even though the odds favored the treatment having no

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effect. For instance, many of us would be willing to take supplemental anti-oxidants if the risk of damage was low (as it appears to be) even if the odds that they extended life were only one in four. In this case it would be correct to say the evidence was against the treatment being effective, but to still conclude that the treatment should be adopted. Unfortunately, given the amount of time (and expense) needed to test a life extending measure in humans, there are many measures which appear likely (or which plausibly could) extend life judging from animal experiments or epidemiological evidence, but which have not yet been shown to actually be able to extend life. The empirical problem with research on human life extension is that many measures that slow human deterioration might have to be utilized from an early age onward. Whether they were having an effect would not be known until that cohort had passed their normal age of death, perhaps fifty or seventy five years later. Studies over that time period are hard to organize and expensive to conduct.

Most popular scientific books leave one with the feeling that the area being discussed is important and worthy of further support. Thus, it is no surprise that this book shows that much progress has been made on understanding senescence, and that further support is likely to result in more progress. Indeed, it does appear that we could find ways of greatly extending human life through senescence research. What is not realized often is that this potential is much greater than for most disease research. The reason is that the major killers (cancer, heart disease, pneumonia, Alzheimer's etc.) kill mainly the old. Someone saved from one of these diseases would usually die in just a few years from another cause. Indeed, because death rates rise so rapidly with age, progress against one of the age related diseases will soon be followed by an increase in the population's average age that returns death rates to their previous levels.

However, if senescence itself can be defeated, or slowed up, gains in life expectancy would be greater than would be achieved by such medical miracles as the conquest of heart disease or cancer. While much research aimed at curing specific diseases must be conducted on humans and by expensive medical doctors, most research on senescence can (and practically must be) conducted on short-lived species such as worms, yeast, fruit flies, mice, rats, and monkeys. Research on these species can be conducted by less well paid biologists and biochemists working in university laboratories.

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The possibility that human life could be extended by calorie restriction below that which keeps people at a normal weight appears worthy of extensive research. While the time needed for an experiment to see if human lives can be extended is very long, projects that closely monitor various biomarkers for aging may be possible and could give results in perhaps ten years.

If severe calorie restriction works in humans, the required diet will be very hard for people with normal appetites to stay on. For those with sufficient will power it may involve continually feeling hungry and thinking of food. The experience of those currently dieting shows that.

Thus, it would appear desirable now to support research on means for reducing appetite. If a very calorie restricted diet eventually is shown to prolong life, we would have the tools in place to actually implement it. If that degree of restriction proves not to be worth implementing, the ability to control appetite could still prolong life. The new knowledge could be very useful to those who are now obese, and whose health is currently suffering because of it.

Several lines of interesting research come to mind from tidbits of information. The reproductive potential of cells (fibroblasts) of rodents undergoing calorie reduction feeding is greater than for control rats. Similar work in humans might be possible, possibly using subjects from poor countries or from Okinawa. Weidruch and Walford, (1988) mention Okinawa as an area whose numerous centenarians may be due to a historically low calorie diet.

Clark states that large breeds of dogs have longer life spans than small breeds. It is easy to see how selection for size would have also selected the genes that promote longevity since a large animal will take more time to reach maturity. If the breed does not also undergo selection for a longer lifespan, it will be out-reproduced by dogs of the same breeds that live longer. When the dog has been genotyped (Celera is doing this), there should be a range of breeds with different lifetimes available for study.

There is another reason for adding a carnivore, such as the dog, to the rodents traditional used in senescence studies. In the wild, most rodents are killed by predators and selection for a long life is weak. Only a few rodents would make it to an age where death from old age was important. Species that are predators, not prey, would be expected to undergo stronger selection for a long life, and to resemble humans more.

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I cannot help but suspect a politician who put conquering death on his platform and explained that it required more research on senescence could win elections.

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Reproductive Perspectives: A Review of Some Recent Books on the Ethics of Manipulating Human Genes

Matthew Nuenke
Chicago, Illinois

The author reviews nine books published during recent years which discuss, from widely different points of view, the ethical impact of Mankind's new ability to manipulate the genetic heritage of posterity.

Key Words: Genetics, human reproduction, reproductive ethics, eugenics, cloning, dysgenics, happiness, eliminating disease

Genethics: Moral Issues in the Creation of People
Heyd, David
Berkeley: University of California Press. 1992

In *Genethics: Moral Issues in the Creation of Life*, David Heyd claims that "Theoretical interest in genesis problems has emerged only after being forced on us by the new dilemmas of demography, genetic manipulation, 'wrongful life' cases, and self-imposed threats to the very future of the human race. Do we have an obligation to bring new people into the world? Do we have a duty to have children? to avoid having miserable children? Is there a right to be born, or a right not to be born, or a right to be born healthy? Can moral principles guide us in artificial genetic molding of humans? Is a world with n happy persons morally better than a world with no persons at all? than a world with 1/2 n equally happy persons? than a world with $2n$ persons who are only mildly happy? Is there a value in the existence (and perpetuation) of the human species as such, regardless of the quality of life of its members? These are some of the questions involved in genesis situations, or at least implied (or presupposed) by them."

This book is an excellent introduction to the philosophical questions facing eugenics and genetic engineering, but like any book based on philosophical questions it can raise more questions than it answers and it too often assumes people have attitudes and wishes that may not be universal, a tendency of most philosophical works. That is,

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without asking or surveying human attitudes, it just assumes people feel a certain way, a fault I find in many of the existential works dealing with the human dilemma of secularization and the loss of meaning in life. For me, an interest in eugenics cuts to the very core of why I exist and what life means. As a member of society I have a right or an interest in reproductive products, specifically the quality of the gene pool as carried by future generations. And that interest for the present can be focused in just two areas, the average intelligence of the population, and in eliminating genetic defects that lead to misery or disease. Heyd seems, on the other hand, throughout his work, to disengage the existing population from any future populations in a way that is intellectually stimulating and yet dismisses continuity as Dawkins describes it in *The Selfish Gene*.

Eugenics is fundamentally a movement that recognizes the futility in hanging onto human religious dogma to thwart our fear of death, and that is for a secular religion that celebrates the overcoming of our human dependence on our selfish genes by taking command of them. It replaces false hope with an embracing of our human potential and our individual vulnerabilities, recognizing that our fear of nonexistence is only one mechanism that our selfish genes have used to perpetuate themselves. Nature equips all animals with both pain avoidance and with mechanisms to hang onto life by all means, even in the face of great pain and suffering. Humans can now face that contradiction and strive for more meaning in personal life, saying when necessary to the selfish genes, "NO! I have my own purposes now that don't include you. The genes are now our slaves, not us theirs."

Heyd finds cloning to be especially repugnant, based on a belief that parents want their children to be somewhat different from them while at the same time being very much like them. I find this an odd position to take, especially since identical twins seem to be quite normal with mirror images of themselves. But aside from assuming what parents want in their offspring, cloning has tremendous potential and benefits for society. Humans with very unique abilities (emergent traits) could be cloned because the odds are extremely rare for such individuals to occur naturally, and their contribution to society is so great. That is, some of the most brilliant scientists and intellectuals are so valuable to all of us that it is to the benefit of society to duplicate as many of them as we can to benefit from their rare intelligence. The argument will be made of course that an Einstein or a Galton may have

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the genes for genius, but environmental conditions will move each cloned individual in different ways. To that I say great, but these very rare combinations of genes that allow an individual to be both brilliant and creative are in fact worth copying over and over again because they are extremely rare and are of benefit to society. And by knowing ahead of time that the genius potential is there, and that there are many clones of the same genetic formulation, we can allow them each to develop their gifts in their own way, in the wombs of the families that will nurture them. No other genetic technology I know of could increase so dramatically the number of super-achievers needed to solve ever-more complex problems.

Also, cloning could be used to study the numerous ways that nature and nurture impact our intelligence. Twin studies have been very useful for this purpose, but the fact that the twins share the same environment in the womb does not eliminate the possibility that twins sharing the same close space compete for nutrition and may not actually have identical environments as assumed, or that the prenatal environment of disadvantaged children is the cause of their low intelligence instead of genes. Cloning would allow the implantation of identical beings into numerous wombs and would finally answer the question – is it really in our genes as all the data has shown so far?

Heyd admits that children are never born for themselves, but only for the benefit of the parents:

> People produce children for a variety of reasons: emotional satisfaction, to provide an extra work force in the family, to have someone to transmit the family name into the future, to guarantee support in old age, to obey God's commandments, to gain self-esteem or reputation for virility, and so forth. None of these reasons or motives refers to the welfare of the child; none of these takes the child as an end in itself." Well, if children serve to benefit the parents, why can't cloned beings benefit the society? Heyd never addresses this legitimate claim. If the nation promotes cloning for bettering society as a whole, while giving life to beings that would otherwise not exist, how are the cloned children better off not being born? They are selected as being the best of the best without genetic disease or adverse behavioral traits, and will be given the very finest opportunities to live their lives in the fullest way. Would not the nation and the cloned children both benefit from using this

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technology for the good of everyone?

Another reason for cloning is to preserve what is truly unique. Again, rare genius is had by the luck of emergent traits, not by any unique method of nurturing, and once available should be preserved just like preserving an historic building or landmark (though they could more easily be rebuilt or constructed from plans). Rawls states "each generation must . . . preserve the gains of culture and civilization . . ." But if this is true, it is even more important to preserve the genes that created the advancements in culture and society be preserving the gene pool that created it in the first place. Culture is dependent on the genetic quality of the people who make it up. It cannot exist in a vacuum. Chimpanzees would not be able to preserve our culture if we gave it to them; the genes must be in place to keep it going. Culture comes from good genes, not the other way around. Drop a thousand bright people onto a deserted island and culture will thrive, while it has never taken root in sub-Saharan Africa without outside influences because the low level of intelligence made it untenable. And even now, South Africa's success is non-sustainable as whites flee the chaos and dissolution of a nation in decline.

Opposition to cloning also comes from what Heyd describes as "deep ecology, in which man and nature are related in a way that would make man lose his identity outside of that relationship and is based on veneration of nonhumans." This view is based on a new moral status for nature, and calls for an establishment of a new ethics transcending the traditional anthropocentric one. But of course this is an absurdity based on one simple observation: I highly doubt that man, mammals, plants, and viruses are ever going to sit down at a table (or tree) and come to an ethical agreement regarding behavior. If Heyd can get all pathogens to agree to never infect another human being, I would be happy to consider such a proposal. Nature assigns no value for existence, nonexistence, or the condition of the planet. Nature just is, and the genetic code is merely an algorithm that has taken on what we call life. Meaning and purpose are arbitrary outside of the perpetuation of this algorithm, and man alone has the ability to ascribe meaning and purpose any way he wishes, individual by individual. I have a profound love and respect for animals, but it is mine alone and I do not expect others to share my empathy in this or other matters, because it is just part of my nature, not part of my moral construct.

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A final point I would like to make is that we are now locked into an "arms race" with regards to intelligence and its genetic basis – thanks to birth control, abortion, and the science of genetics. Never again will we need be ignorant about where we are headed demographically and nationally. This raises an interesting dilemma. Along with the technology for weapons of mass destruction, would we be better off with a world population of advanced humans with an average high intelligence? or one where the overall intelligence was so low that technology could not be used for nuclear war, for example? That is, as protection against a global conflagration, could a dysgenic program work where we would purposefully make all humans stupid? The answer is no, because there would always be an elite that would be necessary to carry the program forward [backward?]. That is, the masses would have to voluntarily accept enslavement by a chosen few, who would promise to self-destruct after the mission had been completed. No, there is only one direction for purposeful evolution, and that is a dramatic increase in intelligence over our present norm, which is viable, attainable, and would be very beneficial for those who have attained this golden blessing that the rest of us now want to enjoy.

Quest for Perfection:
The Drive to Breed Better Human Beings
Maranto, Gina
New York: Scribner. 1996

Gina Maranto gives an excellent accounting of eugenics and infanticide over the past 7,000 years. Humans have long tried to influence birth outcomes. She shows that eugenics is such a natural desire among both individuals and groups that it seems to be an inborn trait. And up until this century it had never really been questioned. Humans want to better their own kin. Ethnic competition, and attempts to eliminate other competing groups is seen in canines, chimpanzees and human groups alike throughout history. Genocide, as a way to better the chances of your own group over competing groups, is no stranger to human evolution, which is steeped in blood.

The first two nations of people that competed with each other in a purely eugenic way rather than simply through human slaughter were the ancient Greeks and Jews. The Jewish community began to practice eugenics initially in competition with the highly literate Greeks. While

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the Greek civilizations died out, the Jewish people have been able to sustain their eugenic programs to this day. And the Jewish secular religion today is singularly concerned about blood purity over any other concerns; it could easily be called a eugenics secular religion. Maranto claims, like all good liberals, that the National Socialists were the first to adopt this blood purity obsession, showing again how the most learned intellectuals can practice extreme self-delusion in pursuit of a political agenda. She also claims that medical geneticists' tinkering may be botched just like other attempts at altering nature, like artificial wetlands or self-regulating biospheres. But again, one can only be skeptical about the viability of eugenics by choosing to ignore the success of those who have practiced it.

She does admit that almost half of all Americans in surveys would favor genetic manipulation to improve the health, intelligence and attractiveness of their children. And where there is a desire and the technology, eugenics is here to stay, even though she would like to see it go away. Overall, the book is a very good history of infanticide and humanity's utter disregard for children through most of its history.

Finally, the obligatory renunciation of the possibility of modern eugenics is hypothesized by an argument that, unlike breeders who practice inbreeding to fix a few specific traits, humans mix up their genes and do not practice inbreeding so fixation would be impossible. Of course this is an absurdity. With regard to eugenic practices for the selection of intelligence, no one is stating that any one gene needs to go to fixation; intelligence is a combination of many genes and these genes can be increased without any form of inbreeding. But even with inbreeding, as effected by Judaism where it has been historically practiced by uncles marrying nieces, there is little evidence that exogamy or endogamy are requirements for improving intelligence.

And of course no book of this kind is complete without denouncing both *The Bell Curve* and the now undisputed work of numerous adoption and twin studies in showing that intelligence is highly heritable by quoting the thoroughly anti-empirical pseudoscientist Stephen Jay Gould et al. Dawkins' latest book *Unweaving the Rainbow: Science, Delusion and the Appetitite for Wonder* (Penguin, 1998) shows that Gould has been thoroughly discredited in the field of evolution because of his commitment to Marxist propaganda instead of scientific honesty.

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UnZipped Genes: Taking Charge of Baby-Making in the New Millennium
Rothblatt, Martine
Philadelphia: Temple University Press. 1997

In Unzipped Genes: Taking Charge of Baby-Making, Martine Rothblatt states that "This book is a call to action, a manifesto for the adoption of a new bioethics of birth. We must formulate our genomic ethics now, or we will assuredly suffer from its absence later. The time has come to declare, for the benefit of all persons living and those not yet born, that demography is as important as democracy, and that an attack on any one demographic group is an attack on us all. The time has come to snuff out the possibility of genomically inflicted demographic death, and to usher in the new millennium with a strong and protective bioethics of birth." And so begins an hysterical diatribe that sounds more like a postmodernist attack on science itself than anything that can be defined as a rational formulation of policy. In fact, Rothblatt seems to be very confused about just what genes are and how they are expressed, which makes sense when a clear reading of this book shows that it is more a call for Marxist propaganda than empiricism.

Rothblatt states that demographic death occurs when certain genomes are not allowed to exist. And this is where the text fails to explain how this can happen. The genome of every individual (excluding identical twins) is unique. So it would be impossible to wipe out certain genomes beyond that of the individual. For example, abortion would wipe out one specific genome, but Rothblatt is in favor of reproductive freedom, including abortion. So she is not talking about that. She seems to be attempting to frighten the uneducated into stopping research in an area where Rothblatt feels frightened. Science is closing in on what makes us tick and she doesn't like it one bit.

Rothblatt throws together such disparate concepts of demography as sex, disabilities caused by genetic disease, differences between groups of people, etc. But genetics plays a different role in each one of these fuzzy categories. She advocates, in the traditional Marxist manner, that the government should assure that everyone has absolute reproductive freedom guaranteed, again apparently using one group's money for another group's reproductive success. This goes far beyond freedom. It is a call for egalitarianism and a flattening of society. It is a call for the most unproductive and failed life forms to be able to breed as fast and

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as often as they wish, without any responsibility for contributing to the maintenance of society. People who have no hope of getting a job do not have a right to have as many children as they want at my expense. This goes far beyond the concept of a safety net for those who have stumbled in life, to a generational approach to guaranteeing a permanent and ever-growing underclass that would sink society permanently into a third-world status. Which I have no doubt Rothblatt would like to see. But the fact is, if one is to have total reproductive freedom, along with that goes total responsibility to suffer the consequences of that freedom. If medicine makes available genetic testing, and a woman decides to have a child she knows will be genetically handicapped, then I must assume she is willing to care for that child without society's support or pity. Freedom includes the right to assume responsibility for your actions.

Rothblatt then goes on to lament reproductive freedom when it is used in a manner that she does not approve of. In India because to marry a female needs a dowry and in China because males are desired over females, using reproductive science, families are aborting females in order to produce males rather than females. She considers this to be demographic death even though there is no difference genetically if a family passes on their inheritance through a female or a male. Perhaps the best thing that could happen for women in these two countries (and others) is that they decline in numbers to such an extent that it permanently changes the culture into a non-sexist one. This could give future value to females in these countries rather than devaluing women as she states. And as Heyd pointed out, children are generally brought into this world for the parents' benefit, never their own. A life never lived cannot be pitied for itself, as even Rothblatt admits. One disingenuous aspect of Rothblatt's argument against this practice is that she throws out numbers and statistics without ever summarizing the data so that the reader can have a feel for the magnitude of the loss of females. Many times, what is not stated is more reflective of the political agenda of authors than reality. She obviously knows what the impact is but has chosen not to reveal it.

She then turns to a rather oblique category of people that includes the handicapped, homosexuals, the obese, etc. What is really interesting is she is here stating that all of these are supposedly genetic rather than environmental, and yet she ignores those of low intelligence apparently in keeping with the Left's credo of never admitting intelligence is

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primarily or even somewhat genetic. This is a curious omission in light of her concern for these other groups that may not be genetic at all. A handicapped person can come upon this condition by accident or disease alone; why would we not try to eliminate genetic disease when we can? Clearly, of the many ways we use eugenics, the responsible parent who can create numerous combinations of a child's genome would want to select one that is free of debilitating genes. There is absolutely no reason to bring a child into the world with a severe genetic handicap instead of one with better chances of a happier life without the handicap. And yet, Rothblatt would encourage us to have children who will undoubtedly suffer so that she can advance a diversity agenda that ignores the happiness of the individual.

Rothblatt goes on to state that "Demographic death is the extinction of a social group, of a unique piece of human culture." This very confused thinking is hard to decipher. Is culture carried in the genetic defects we would rather live without if we could? Should we not have vaccines against disease because it may change culture is some bizarre way? She seems to think that by using eugenics to improve the prospects of future generations, we are somehow destroying culture.

But she ends this absurd proposition with the radical environmentalist's proposition that "Any genome can give rise to any kind of person." This bit of pseudoscience shows just how extreme her position is. Note that there are no behavior-geneticists or sociobiologists that don't wholeheartedly endorse that we are a combination of nature and nurture. Anyone who would make such a statement, that genes have no impact on a person's life prospects, can only hold such a position by completely ignoring all of the available research to the contrary. She is plainly and simply a propagandist ignoring all empirical data. And this is rather scary as she is the Chairperson of the Bioethics Subcommittee of the International Bar Association.

Later she writes, "People are not their genome, they are independent souls with equivalent rights and dignity regardless of chromosomal configurations." Now this sounds like something from the religious right, and yet she later argues that there is no particular place in time that life begins, a concept also put forth by many evolutionists. So exactly when does one get a soul? Where does it come from? What evidence does she have that we have a soul? Most scientists dismiss the concept of a definable soul. If Rothblatt actually believes, as she states, that all of nature is interconnected, then animals must also have a soul.

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This opens up the dilemma that if demographic death is wrong for humans because it permanently destroys some unique genetic combinations, then we shouldn't try to get rid of AIDS because this is also a unique form of genetic code that needs to be preserved for the sake of diversity. Bizarre reasoning, but easy to assemble when one is using self-deception to put forth a purely political agenda. There is no sound science in this book aside from bits and pieces she has gleaned from others for her subterfuge. Thus:

> The blind, the deaf, the fat, and the freaks suffer not from pain but from prejudice. Their disease is only society's disease with them.

She would like to have us believe the pain of physical disability would go away if only we were more tolerant. Such a rebuttal must by nature be anecdotal, because I am unaware of any studies showing where the pain comes from for different types of deformities.

And again, the obligatory dismissal of race.

> Unfortunately, most of the followers of Galton, up to and including Richard J. Herrnstein and Charles Murray, the authors of a much publicized and frankly pseudoscientific tract called *The Bell Curve*, make a major human classification error that Darwin himself knew enough to avoid. That error is to subdivide humanity into 'races' based on skin tone, hair texture, and facial features, and to assume that certain behavioral genes go with certain 'races.' Scientists are clearer now than ever that 'race' as society knows it – black, white, and so on – is a political creation, not a genetic reality.

For a hundred years now, the Left has been trying to claim race does not exist. It really does not matter to eugenicists; we can talk just as meaningfully about various groups of people, and divide them up any way we like by looking at what phenotypes (the expression of genes) are being expressed, including intelligence (see my article on the intelligence of dogs). Finally, her claim that Murray and Herrnstein's work is pseudoscientific flies in the face of logic. Their work is being reanalyzed, deciphered, and looked at by many other empirically-minded scientists who do not operate under a political agenda, unlike the postmodernists who dismiss the scientific method altogether. But this is how they try to win, by claiming that all science is

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pseudoscientific if it does not adhere to a Marxist perspective. Even bad science can be used to build upon, but non-science is pure dogma and worthless to real scientists.

Rothblatt does embrace some forms of eugenics while condemning others. There are personal eugenics (a couple's decision alone), social eugenics (the state encourages eugenic outcomes), negative eugenics (eliminating genetic defects), and positive eugenics (like selecting for higher intelligence). I note that she is in favor of personal eugenics but condemns social eugenics, and yet we already have social dysgenics when welfare perpetuates the breeding of a genetic underclass at the expense of the overclass. But of course this is never admitted to because the radical Left is in total denial that genes have any impact on where people end up on the social ladder. As to negative eugenics, screening for genetic defects is already being done and will continue at an accelerated pace by both the state (free clinics, etc.) and by couples. Positive personal eugenics is already being practiced by one who selects a mate with the quality of the children in mind, and I'm sure Rothblatt is a result of many such matches by her ancestors. So the only question is, will society be allowed to encourage social positive eugenics, such as tax incentives for the cognitive elite to have more children? This is already being done in Singapore where the state gives rewards to college graduates who produce more children. In the U.S. this could be accomplished by giving substantial tax credits for each child, but in such a way it would only benefit those with higher incomes to increase the number of children born to the overclass. At the same time, we would only dispense welfare checks to mothers who agree to Norplant implants, to be removed when and if they are able to earn a living on their own. I see no oppression in these eugenic practices, no more than we have now, demanding that some Americans subsidize others they have no relation to or obligation to. And this is what probably disturbs Rothblatt so much. Eugenics in all of its forms is already here and here to stay, and such people as Rothblatt feel overwhelmed by the scientific advances that will bring it into full play in the next few years (the Human Genome Project is expected to be completed in 2003).

Rothblatt's leftist authoritarianism really comes out in this book when she calls for a national program of inocuseeding, where all males at, say, puberty will have their sperm stored by the state, and then the males will be given vasectomies to be forever sterile. Somehow she feels this is necessary to assure that women are not treated as 'mother

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machines.' She spends a lot of time on the concept, and while regarding social eugenics is immoral she recommends inocuseeding is absolutely necessary to bring value back to having children.

Finally, she states that:

> One of the fundamental fallacies of eugenics is: Making 'better people' will make a better world. I've been to lots of ivory towers. They are nice places to visit, but I wouldn't want to live in one. The message of euthenics makes much more sense: Making a better world makes a better world. Genes don't offer a sense of accomplishment. Only accomplishment itself offers this bedrock [reason for existing]. And the magnitude of accomplishment depends not at all on one's genetic starting point. Whether we climb from a canyon to a cliff or from a meadow to a mountain peak, it is the climb, celebrated by society, that makes our world a wondrous place."

Well, living and working in a multicultural urban area, and having just returned from a one-day visit to Oxford where I was fortunate to get Dawkin's latest book to read on the flight back to America, I can tell you it is a very wonderful world where the truly intelligent dominate, without crime and poverty. But each to his own, maybe she likes being raped or the fear of it on a daily basis. Again, she is in denial of our evolutionary past.

The one thing that makes humans unique is their intelligence, and that could have occurred only through adaptation. We don't expect to see monkeys go to college, or to promote welfare amongst other monkeys, because they do not have the cognitive equipment to undertake such a social reconstruction. And making a better world is transient and unenduring compared to making a better human. When all people are free of poverty because they can be productive, when there is little or no crime because intelligence and morality are intimately linked by knowing right from wrong, when every generation is fully equipped with the genetic capital to understand the world around them, while more and more of the people are without debilitating genetic disease so we can devote more time and attention to those who succumb to accident or disease, then we will have a better world. It won't be a world that has to expend more and more resources supporting more and more people of low intelligence because

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of our dysgenic policies.

Unraveling DNA: The Most Important Molecule of Life
Frank-Kamenetskii, Maxim D.
Reading, Massachusetts: Addison-Wesley. 1997

In Unravelling DNA: The Most Important Molecule of Life, Maxim D. Frank-Kamenetskii gives a clear understanding of genetics without political overtones. For a good understanding of the mechanics of genes, this is an excellent book.

He proceeds to express some philosophical thoughts on the subject.

> It is very hard to admit that there is only one single reason for each of us to come into this world: to transmit our DNA to the next generation. There is absolutely no other purpose for us to be born. It is very uncomfortable to realize that our body is actually nothing more than a shell to carry DNA. There is no difference, with respect to this goal of existence, between a human and a bacterium, or a simple virus, or even a plasmid. From the biological viewpoint, people have been wandering in darkness trying to find the goal of their existence in cults, religions, music, poetry, and fine arts. Although they all have the same goal, various species differ drastically with respect to the means they have at their disposal to reach this goal. Keeping in mind the simplicity of the goal, the diversity and the degree of sophistication that nature demonstrates seems truly amazing. However, if you think about it, you will realize that under conditions of fierce competition for limited resources, more primitive organisms should eventually lose to more sophisticated organisms, let alone different species. It still remains to he seen whether humans are sophisticated enough to avoid eventually following the fate of dinosaurs. One can state that the above argument is correct only for rather sophisticated organisms, like animals, and that primitive organisms like bacteria, viruses, and plasmids compensate for their lack of sophistication by their ability to multiply with fantastic speed.

The above is unabashed science, bringing you stark reality without cowardice and aversion. Richard Dawkins coined the term "the selfish gene," and in *Unweaving the Rainbow* he takes on the assumption that

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genes are destiny. Humans alone can use their immense creative power not only to build upon science and technology; they can now purposefully direct their own evolution. This is the most creative endeavor ever undertaken, and it is our best hope for peace and happiness without disease or want, while turning from the material to the intellectual. Marxists would deny people this intellectual world for one filled with material needs only. For leftist intellectuals to deny others access to this world is both cowardly and elitist.

The Human Genome Project:
Cracking the Code Within Us
Marshall, Elizabeth L.
New York: Franklin Watts. 1996

In a short book entitled *The Human Genome Project: Cracking the Code Within Us* by Elizabeth L. Marshall, details of the Genome Project are discussed in a clear and rational manner, devoid of the scare-tactics used by those who oppose genetics. She explains some of the genetic diseases that can be cured and points out that the Project could eventually lead to discovering the genetic errors responsible for more than 4,000 inherited diseases. She also assures us that intelligence is a combination of many complex genes, and we should not be looking for a cure for stupidity or a magic bullet for genius. Genetic intelligence can only be increased for the near future by good breeding.

She does answer the question about the number of girl babies not born in China due to sex selection: an estimated 1.7 million a year in a population of 1 billion. This explains why Rothblatt didn't want to give an exact number. With a slight over-representation of females born to males born naturally, there are already many more females, and 1.7 million less in this large a population can only help to give women more value in the future. But demographic death it is not.

In one sickening note that Rothblatt would applaud, Marshall does state that the Cystic Fibrosis Foundation opposes genetic testing to eliminate this devastating condition – seemingly would prefer to have a sampling of these crippled children around than to allow testing of fetuses. Would we likewise allow lead paint in ghettos because we would rather cure lead poisoning than eradicate its cause? This perverted philosophy would continue sickness just to have more misery in the world.

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The Lives to Come:
The Genetic Revolution and Human Possibilities
Kitcher, Philip
New York: Simon & Schuster. 1996

In *The Lives to Come: The Genetic Revolution and Human Possibilities*, Philip Kitcher takes a shot at several aspects of eugenics without ever really coming to grips empirically with the data; but he does a fair job of bringing forth relevant issues that need to be debated from all perspectives. Kitcher sounds the alarm with regard to disability activists who are fearful that terminating pregnancies because of genetic disease will "worsen the plight of those who are born with conditions, both through the withdrawal of support and through loss of respect." As I noted earlier, this is absurd, as society is marching toward ever greater empathy and concern for others, while improving human chances of a life free of disease. The polio vaccine did not bring about less support or empathy; and there is no evidence that genetic screening and the aborting of children who will have little chance of a meaningful life will do so, either. So we must dismiss such concerns without some evidence to the contrary.

Kitcher supports what he calls laissez-faire eugenics (personal eugenics henceforth) while dismissing utopian eugenics (social eugenics henceforth) as going too far. His objection is simply with social eugenics, asking what traits would be enhanced? I would argue that intelligence is the only trait humans are noted for, one that separates us from other creatures, while all other traits are part of the limbic system and are common to other animals; and that we can pick intelligence as the one trait worth selecting for. Free of disease, the human who has a higher intelligence has been shown to be on average more moral, more responsible, freer of violent action, and will be more productive, resulting in making more resources available for the betterment of all people. Kitcher points out that the most money spent on health care in the U.S. is used to treat people in the last 18 months of life. It would seem that this will only become more of a financial burden on society, and we must have a population that is very productive in the short time allotted for production rather than for benefiting from shared resources. That is, people in the future may only work about one-third of their natural lives. The majority must become more productive in order to meet the demands of an ever-aging population.

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He does feel strongly that children who would be born into the world with little chance of hope should be aborted: abortion would only free the soul from a physical body that has little chance at a meaningful life. That soul may not even be capable of finding salvation because of a lack of cognition. Abortion, it would seem, would save such a soul from eternal damnation and would be the only humane thing to do. God has given all humans free will, according to evangelical Christians, and anyone who holds to that doctrine must believe that a severely retarded person could not have the required faith or understanding to meet the requirements for salvation. How could any Christian send a child to damnation, rather than to spare his soul? (See *Nonbelief & Evil: Two Arguments for the Nonexistence of God*, by T.M. Drange, for an in-depth analysis of these contradictions.)

One must take issue with Kitchner's warning that having a lot of smart people would not make a better world. He states, "Enhancing some human capacities, such as our ability to resist infectious diseases, might benefit us all. But a widespread practice of improving on nature – say, by increasing our cognitive powers – could easily have unhappy consequences. A future in which people are frustrated because they cannot lead lives consonant with their abilities is unattractive; one in which society is planned to contain people with enhanced abilities, the alphas, and diminished capacities, the epsilons, is morally repugnant." A wide gap in intelligence may be morally repugnant, but that is exactly what we have now. Tests generally report that Sub-Saharan Africans have an average IQ of 70, U.S. blacks 85, U.S. Caucasians 103, U.S. Asians 106 and U.S. Jews 117.

It is arguable that poverty, rampant AIDS, and brutality in Africa, have all been caused to one degree or another because of low IQs or a radical disparity in IQs. So if all people are raised to a high level of IQ, with a shrinking standard deviation, would we not all be better off? It seems to me we would. And there seems little logic in the argument that we would have a lot of frustrated smart people, because they couldn't find meaningful work. Just because one is intelligent does not mean he cannot enjoy more physical forms of labor.

Finally, Kitcher warns against genetic disclosure, stating that

> If people at high risk for certain diseases become uninsurable and unemployable, then society will indeed contain a new class with many of the attributes that cause stigmatization: These people will

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> be poor, they will not work, they will be deprived of other opportunities, they may come to have a higher crime rate. Just as failure to solve the problems of insurance coverage echoes in the context of employment decisions, so too inability to prevent either of the tangible forms of genetic discrimination will produce new pariahs.

This is a fairly common argument for keeping genetic information out of the hands of employers, insurance companies, etc. I have some sympathy for this right to privacy, but it has in the past been abused in the other direction, when employers have been denied the opportunity to test employees for levels of intelligence because certain minorities did so poorly. So I ask, am I to be denied the right to present to an employer my list of credentials as to why I should be accepted, including: intelligence, conscientiousness, morality, good health, etc? What would prevent me from showing my good genes about, just like people show off their other talents and attributes for personal gain? Is the government going to deny me access to my own genetic information, or make it illegal for me to divulge it? These are all real problems and I would submit that it would be far less oppressive to let people compete as they do now, and try to cure or reduce genetic defects through eugenics than to embrace authoritarianism in defense of the disabled. Such a world would lack the very freedom that makes life worth living.

Improving Nature: The Science and Ethics of Genetic Engineering
Reiss, Michael J. & Roger Straughan
New York: Cambridge University Press. 1996

Improving Nature? The Science and Ethics of Genetic Engineering, by Michael Reiss and Roger Straughan (R&S), has two main components, the science of genetic engineering with an excellent explanation of mutations, and the moral/ethical aspects of genetic engineering. They explain how human genes have already been put into pigs, and how we may be able to change the genetic make-up of humans. Further, they tell the genetic basis for making these species-level changes in humans' genetic code.

R&S also give a great deal of time to explaining the different types

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of genetic mutations that occur. For example, a whole chromosome may be lost or gained, such as an extra copy of the small chromosome 21 that causes Down's Syndrome. Or part of a chromosome may be inverted, but be fully intact. And they explain how dominant and recessive genes affect us and how they are transmitted from generation to generation. This is probably the best book reviewed here that deals with genetic and chromosomal mutations and how they interact to make us what we are, including the dangers of genetic engineering on humans. First, genes often work best when they are situated next to each other, and mistakes in insertion locations may interfere with tumor-suppressor genes. But these are all technical problems and there is good reason to believe they will be overcome through the Human Genome Project.

Less time is given by R&S to the ethics of genetic engineering, but it is also the most controversial and interesting part of the book. They do point out that "Ethics is normally thought of as a narrower concept than morality, and it can be used in several different, though unrelated, senses. The most general of these suggests a set of standards by which a particular group or community decides to regulate its behavior – to distinguish what is legitimate or acceptable in pursuit of their aims from what is not, such as 'business ethics' or 'medical ethics'." What this means is that what is ethical and what is unethical is a matter of mutual agreement: ethics are not something that can be imposed on others. Those who oppose genetic research forget this when they try to impose secular or politically-motivated ethical standards on scientific procedures because they fear that the knowledge that may result will harm their egalitarian cause. (See Kevin Macdonald's *Culture of Critique,* Praeger, Westport.)

R&S then discuss the morality of genetic engineering, both intrinsic and extrinsic. Intrinsic are actions that are right and wrong on their own (based on religion, evolution, etc.), and extrinsic only considers the consequences, beneficial or not, of actions. The authors do a good job of explaining these two positions; and how, for example, in the debate on abortion the two sides are arguing from different perspectives with regard to what is moral (extrinsic versus intrinsic). What they do fail to discuss is that if humans share a moral history with other primates based on the reproductive success of the tribe, how can we apply morality to present-day actions of right and wrong? Neither the utilitarian, consequentialist, Kantian deontological formulations, nor any

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other system, has any innate truth when morality is considered within an evolutionary perspective, the only perspective that is empirical.

I especially liked their discussion of 'holistic', 'ecological' or 'environmental' objections to genetic engineering. They point out, of course, that humans have been breeding crops and animals for over 10,000 years and that virtually everything humans do is in this sense unnatural; by which they mean incapable of being done by other animals. As they state, "the progress of civilization has been largely dependent upon our 'interference with nature'." At one time, religion was used to try to stop scientific progress; but as faith in religion has declined, the anti-empiricists have had to turn to other forms of mystical arguments in order to block change. There are now attempts, even though we have not been able to assign a non-Darwinian moral system to humans, to apply arbitrary moral rules to all of nature. These arguments are made more in the milieu of postmodernist arguments that become incoherent when evaluated rationally, but the volume of emotionalism often overshadows rationalism, and can sound convincing.

None of the holistic arguments make any sense outside of life as a genetic algorithm that increases in complexity as it progresses, without any actual goal. Humans, like any other species, will seek to exploit every corner of their ecological niche for their own benefit. However, humans, with our large brains and our ability to contemplate our own deaths, finally have the means arbitrarily to give meaning and purpose to life, in our pursuit of trying to assuage our death *angst*. Some turn to mysticism, some to Marxism or to racial purity for their own tribe; some embrace science and accept the inevitable, etc. This is where eugenics as a secular religion fits in. It is merely an act of creation, directing our species to an ever-higher level of intelligence which will help to better comprehend the many remaining fallacies of belief we have adopted in our journey from our primate past.

Does this mean that eugenics as a secular religion is similar to Christianity in being an anthropocentric religion that establishes a dualism between man and nature, where it is our duty to exploit nature in the name of God, as R&S point out? Hardly. It is based on science and does not fall into a deist fallacy. Eugenics as a secular religion is merely an act of creation using purposefully directed evolution as its tool. Where it is going, the means taken to get there, and the safety mechanisms to be used to obtain the expected results are the same as with any scientific project. But it is not subject to metaphysical

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concerns. It readily accepts the arbitrariness of human actions, and is based on the simple observation of science that more intelligent people who have fewer genetic diseases will live a more fruitful life, on average. It is no different than wanting to build safer and safer airplanes because then fewer people will die in plane crashes. But it does tend to further desacralize life for those unable to accept the inevitable death *angst* that they must live with, and is attacked on this basis alone.

An attempt is made to reject 'speciesism' in favor of a moral system which extends to all creatures. "Put at its most succinct, it is of little significance, the argument goes, that humans belong to a different biological species from, say, chimpanzees, dogs, farm animals and laboratory mice; we do not have the right to treat such species merely as we choose and for our own ends. Think of the conditions we normally require before humans are permitted to be used as research subjects." But the fact is, that even though chimpanzees will treat each other in the troop with some moral considerations, even taking care of an injured member, they will go on raiding parties to kill members of other troops. Canines and felines will also kill their own. So if mankind is to put aside speciesism and rejoin the moral constructs of other animals, then the only moral imperative is reproductive success, and that includes practicing genocide whenever we can get away with it to benefit our own kin! Is that really what these moralists (specifically Peter Singer) are arguing for? Such formulations of human ethical behavior can only be grounded by ignoring our own evolutionary past and all the empirical evidence regarding our true nature.

R&S discuss the 'ethics' of using DNA fingerprints to establish a national database for controlling illegal immigration, deciding paternity suits, and fighting crime, amongst other uses. But a more complete discussion is to be found in Richard Dawkins' new book *Unweaving the Rainbow: Science, Delusion and the Appetite for Wonder.*

Finally, R&S introduce another anti-intelligence argument, stating that if we become too smart we might regret it. If our memories become too sharp, we may not be able to forget unpleasant happenings. This seems to me a rather unlikely suggestion, since it would imply that people with good memories suffer more from such a condition than those with poorer memories.

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Living With Our Genes:
Why They Matter More Than You Think
Hammer, Dean & Peter Copeland
New York: Doubleday. 1998

Dean Hammer and Peter Copeland (H&C) have produced an interesting book that looks at various character traits or 'temperaments' that are influenced by genes: Emotional instinct, thrills, worry, anger, addiction, and sex. In addition, they include intelligence and how genes are involved in its expression. It is important to note that diversity in personality or 'temperament' is controlled by the limbic system, which is shared by all animals and was used by primates long before we acquired a higher intelligence. That is why as a social eugenicist I would argue that while intelligence needs to be raised to higher levels, the diversity of temperaments should not be a target for modification. I would not try to eliminate shyness, for example, or increase novelty-seeking.

H&C discuss at length how temperament is influenced by genetics and the resulting brain chemistry that makes each individual unique. For example, it has been found that "shyness, or being outgoing, is inherited at birth and lasts a lifetime." This is a condition that I am sure many people have assumed was determined by the family environment. These differences are caused by "enzymes [that] make and degrade more than 300 brain chemicals that influence thinking, acting and feeling."

Intelligence, however, is separate from the limbic system and is rational: it is the prime distinguishing quality between humans and all other animals. This again is not speciesism; it is just an observable fact, and does not make humans better or worse than other animals. But after over 100 years of research, intelligence has been shown to be useful in adult life. and there is no reason whatsoever to want more diversity in intelligence, but rather to elevate everyone to the highest level of cognition possible.

Many have sought to argue how similar all humans are with respect to intelligence, and indeed how similar people of all races are genetically. However, although differences in temperament and intelligence may be caused by just 0.1% difference in genes between people, there is only 1 to 2% difference in genes between humans and chimpanzees, so it is misleading to argue how similar human beings are genetically to each other when a few genes can have such a profound

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impact on temperament and intelligence, leave alone other characteristics and qualities. Evolution has made sure that we are all different from each other, thus repeatedly 'selecting and reproducing' in different environments so that the genes that have the highest survival value are passed on in ever-increasing numbers. Behavior genetics, as the science that studies differences in genetically controlled human behavior, is only about 30 years old, but it is advancing at a phenomenal pace.

The most accurate tool so far for determining how much of any trait is inherited has been twin and adoption studies where both identical twins and siblings have been reared apart (see my review in Detterman, Douglas K. and Linda S. Gottfredson, eds., Special Issue "Intelligence and Social Policy, *Intelligence,* 24:1-283, November 1997). Using numerous studies and mathematical methods, accurate estimates can be made of heritability. The results of these studies by Thomas J. Bouchard Jr., director of the Minnesota Twins Studies, were shocking when they were first published in 1988, and then later replicated by other researchers. They showed clearly that genes do matter more than we had thought. Nature was winning out over nurture;

> ...in fact, it is part of our nature to respond to nurture.... Giving children love and knowledge is as essential as giving them food, but at some point, parents must understand that children are already on a path beyond anyone's choosing. Children are who they are, and parents are better off getting to know their own children than trying to mold them into some ideal created out of thin air.

Two researchers have divided up novelty-seeking, according to H&S. Robert Cloninger says it is made up of exploratory excitability, impulsiveness, extravagance, and disorderliness. According to Marvin Zuckerman, it is made up of thrill and adventure seeking, experience seeking, boredom susceptibility, and disinhibition. But it is highly heritable (40%) and is an important trait in determining how we behave. Nevertheless, it is hard to recognize. A novelty-seeker may be promiscuous, go mountain climbing, or stalk the Internet heatedly debating various sensitive issues. It is definitely not cognitive, but comes from the limbic system. High scorers always need to take a deep breath before acting to allow the cerebral cortex, the planning part of the brain, to put the brakes on some careless or dangerous behavior. Of

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course, that is where intelligence comes in. We need both people who are high and low on novelty-seeking, but intelligence will always help to control the more impulsive behaviors of the thrill seekers.

Novelty-seeking is also an important factor in marriage. Different levels can cause problems for mates. As H&S state,

> ... having different levels of novelty-seeking is a frequent source of dissatisfaction in relationships and marriage. Behavioral geneticists call 'birds of a feather' by the fancier name 'assortative mating.' There is good evidence of assortative mating because of social attitudes, such as religious beliefs, tolerance for diversity, and political views, and to a lesser extent for intelligence. However, for most personality traits there is no assortative mating: correlations of personality scores between spouses are usually close to zero. Novelty is an exception to this rule.

Harm-avoidance, neuroticism or emotional sensitivity (taken as one) is another major trait we share with other animals but is extremely important in our everyday lives and is highly heritable and hard to alter. It is responsible for giving us our outlook on life, and includes anxiety, fear, inhibition, shyness, depression, tiredness and hostility. From an evolutionary standpoint, mild anxiety and depression are useful under certain circumstances, and this is no doubt the reason it is so common. This is not only for escaping from danger, but as H&S point out, ". . . a fretful, crying baby is more likely than a calm, quiet baby to attract a mother's attention and care. One study in Africa showed that infants with a 'difficult' disposition fared better than those with an 'easy' temperament during famine." And later, using teleological language, they asssert that "Depressed or not, happy or sad, the gene doesn't care about how you feel. Its sole concern is to be passed on to the next generation."

The authors also make an interesting point that happiness is fairly constant, citing studies of lottery winners who were no happier one year after winning large amounts of money. And this, too, makes evolutionary sense. Our genes don't care about our happiness but only whether we are reproductive. Therefore, greed for money, or the urge for wealth, attracts females to wealthy men. An organism that suddenly finds complete contentment, they argue, perhaps questionably, is no longer reproductively motivated.

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The genetic determination of sexual preferences for a long time was thought to be found in nurturing, but research into many cultures shows a revealing pattern of repeatability proving that it is much more genetically innate. Women are looking for commitment and resources (money) from men to help raise children, and men are looking for youth and beauty in women to sire healthy children. The two objectives are contradictory, but the tensions set up can create a stable family for the nurturing of children. As H&S state, "the best thing a man can pull out of his pants is a big, thick wallet."

Perhaps the most controversial question about sex is the heritability of gay genes. H&S indicate that the heritability of male homosexuality is about 50%, and "The best recent study suggests that female sexual identification is more a matter of environment than of heredity." As with intelligence, the prenatal environmental impact is very hard to test for by using twin and adoption studies. And sexuality is determined by hormonal changes during pregnancy that can be impacted. What this means is that even for identical twins, the mother's chemistry at critical times of development may alter the directional path of sexuality, influencing sexual preference.

Returning now to intelligence, always the most difficult subject for an author to discuss because of its political taboos, H&S state that "There is no single factor more important in an adult's IQ score than genes." And they also give a very good accounting of the chemistry involved in memory, how we learn, the parts of the brain involved in cognition, etc. They provide a very good general introduction to intelligence that covers some areas that others on the subject leave out. They reiterate what many on the left keep trying to deny. The Marxist Gouldian apologists would like us to believe that "we all have special and unique talents." But the evidence belies such propaganda. H&S state:

> But it's also clear that people who are particularly bright tend to be good at many different types of mental activities, while less bright people rarely excel at any. IQ tests reflect this diversity of skills by asking different types of questions. When the scores from thousands of IQ tests are analyzed, two results emerge. First, there is a general cognitive ability factor, called the 'g-factor' or simply *g*, which cuts across all the different types of intelligence measured by an IQ test. People who are high on g tend to do well on all aspects of the test,

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> while those who are low on g do not fare as well across the board. Second, there are specific areas of mental expertise that are partially but not completely distinct, such as word fluency, numerical calculation, spatial visualization, memory, and so on. So overall intelligence depends on a combination of general ability and specific expertise. Although the significance and usefulness of IQ tests are passionately debated, one point should not be lost: IQ tests do what they were originally intended to do, they predict a person's ability to perform in school. In study after study, IQ is the single best predictor of school performance. Although many other factors, such as socioeconomic status and parental occupation play some role, there is no other better predictor of a child's grades or of how far he will proceed in his education.

They go on to describe how heritability is calculated, and conclude, along with most psychometricians, that intelligence is between 50% and 80% inherited and that heritability increases with age.

This is all pretty standard stuff, but continually denied by Gouldian apologists and the media, through slippery denials and begging for more time to try to make intervention work in raising those with low IQs out of poverty. But the results of such efforts have been miniscule and embarrassing for egalitarians. Of course, environment is important and no one denies it. H&S describe a study of children raised in orphanages without love and human contact and they show its deleterious effect on cognition. But most of us are aware of such treatment for humans and animals alike. When the young are severely deprived of nurturing contact, they will suffer. But does that apply to many children? Hardly. Even those raised in what is considered poverty by today's standards are well fed and clothed by standards of only 100 years ago. So as long as children get enough emotional contact, as seems they must in even the most poverty-stricken households, they should not suffer from any deprivation that will impact them intellectually later in life.

H&S state that the argument in *The Bell Curve* that shows a racial genetic disparity in intelligence is unsound because twin and adoption studies cannot be used to determine this. They then go into one of the standard Gouldian analogies about planting seeds in bad or good soil and how they wither or prosper, the same old rehashed apologia. And then they put forth the racial mythology argument: blacks feel bad about themselves and therefore don't test well. Usually one or two

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short dismissals of racial genetics suffices for many of these authors who want to write about genes and how they impact our lives, but who run into the differences in intelligence between population groups and feel they have at least to mention it. But of course it is a dilemma for them. No matter how they really feel, because most of them are academics or in the field of making public policy, they must follow the politically correct course and dismiss *The Bell Curve* (Richard J. Herrnstein and Charles Murray, The Free Press, 1994) while at the same time ignoring subsequent research and publications that support the results.

In fact, it has gotten to the point that *The Bell Curve,* because of its popularity, has caused many to overlook Arthur Jensen's 1998 book *The g Factor: The Science of Mental Ability* that deals specifically with race differences in IQ, and concludes that they are both real and significant. Any further dismissal of this disparity must answer Jensen's well-researched and academically reviewed results. Jensen argues that environment could not account for the 15 point IQ gap between blacks and whites, not to mention the 15 point IQ gap between whites and Ashkenazi Jews. And if we factor in the reported sub-Saharan African's IQ of 70, then Gould et al. will have to explain in terms of the environment a difference of 47 average IQ points between the two groups, a phenomenal difference in intelligence that can only be explained by genetics.

Remaking Eden: Cloning and Beyond in a Brave New World
Silver, Lee M.
New York: Avon Books 1997

In *Remaking Eden: Cloning and Beyond in a Brave New World*, Lee Silver tackles genetic engineering with the creative flair that only a true scientific empiricist can muster. This is the only book of those reviewed that could be considered futuristic and unabashedly scientific in every respect. This represents a remarkable achievement in describing what is in store for genetic engineering.

Of the books reviewed, only *Remaking Eden* takes a futuristic look of what is available now and in the future and paints some interesting scenarios. Only *Remaking Eden* underlines the potential importance of purposefully-directed evolution, under the conscious control of the human intellect, versus the algorithmic control of the selfish genes that

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have heretofore had control of human destiny. Egalitarians would like us to turn our backs on our human nature and pretend we are somehow beyond the rules of nature and that only an egalitarian universalism will solve the world's problems. Silver shows us that with the advent of eugenically-motivated genetic engineering, the future would be nothing like the Marxist perspective of human conflict, but could transcend our present concept of human llimits.

Silver opens with a discussion of the future 'GenRich' class of people – those wealthy enough to provide their offspring the advantages of having designer genes inserted into their germ cells that will be passed on again to their children. Will they technically be considered a new species? How far can the genetic alterations go before breeding between the GenRich class and Naturals will no longer be possible? Is it then morally acceptable for the Naturals to kill the GenRich as a dangerous intellectual and manipulating predator class, or for the GenRich to thin the herds of the Naturals the way we thin deer herds when they do not have enough to eat? After all, they are separate species, with talents, heritable diseases, and intellects so different from each other that empathy and compassion for the new underclass will wane to the point of being replaced by contempt, like rats in the alley.

The Left, of course, will try to stop this from happening by shackling human reproductive freedom by passing laws against such practices. But of course this will only accelerate the speciation process by restricting those with moderate-to-low incomes from taking advantage of genetic engineering in favor of the upper-class who will vacation and conceive their children in countries who will remain free to advance human evolution, while also being able to provide their own citizens with enhanced genes. These countries (probably Asia) will advance in their average genetic capital traits like intelligence and technical advancement while those controlled by the religious right and the old Bolshevik Left will unite to deter this technology altogether, all in the name of preventing an ideology they cannot accept, evolutionary empiricism. Science will be subordinated for postmodernist propaganda about how the world should be molded into the classless state, one that will fail because it ignores the realities of human nature.

Silver continues:

> But, as one might imagine, GenRich parents put intense pressure on

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> their children not to dilute their expensive genetic endowment in this way [intermarriage between GenRich and Naturals]. And as time passes, the mixing of the classes will become less and less frequent for reasons of both environment and genetics. The environmental reason is clear enough: GenRich and Natural children grow up and live in segregated social worlds where there is little chance for contact between them.

That parental pressure already exists, of course, in Orthodox Jewish genetic separatism and to maintain Jewish blood purity. There is great concern among Jews about intermarriage, precisely because they are the forerunners of the GenRich class; the rest of whites and Asians are the Naturals. He continues:

> Anyone who accepts the right of affluent parents to provide their children with an expensive private school education cannot use 'unfairness' as a reason for rejecting the use of reprogenetic technologies. So the future will just include more minority groups who will choose to maintain racial or species blood purity in order to maintain their cultural and economic superiority over other groups. The competition could become severe and violent if we are to believe human reactions to threats of dominance or subjugation...

Silver also offers a coherent explanation pertaining to abortion and when the problematic question as to when a human life begins. He divides life into human life in the special sense versus life in the general sense. Life is nothing more than a high degree of internal organization that uses energy to maintain a high level of information content. Death is when the energy gets turned off and the information and internal organization of the living thing begins to dissipate. So even death has no absolute boundary or point in time. Different parts of the body we call dead will continue to live for some time until the energy runs out. And human life in the special sense is located between our ears in our consciousness that results from a highly organized and functioning nervous system.

So when does human life in the special sense begin? First, it cannot occur until the nervous system is functioning; until then there are just cells growing, not unlike bacteria. The fertilized egg is alive as organisms go, but no human essence of consciousness is present. Silver

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then discusses some anomalies even if some people still believe that there is a soul present at conception. If so, what happens to all of the naturally aborted embryos that are the rule rather than the exception? What about embryos that start out as one and then split into identical twins? Do they share a soul or each get a new one? What about chimeras? – a rare occurrence where two embryos mix their genetic content and the resulting child is really made up of parts of both beings. Do they each share part of each other's soul? And cloning. If a human life can be created without conception, it is invalid to say that conception must mark the beginning of each new life.

Silver asks:

> 1. Is the embryo alive? Clearly, yes. 2. Is the embryo human? Yes again, but so are the cells that fall off your skin every day. 3. Is the embryo human life? No. The embryo does not have any neurological attributes that we ascribe to human life in the special sense.

When we speak of life we include consciousness, feelings, the ability to feel pain, anger, fear, etc. These are all part of animal life and it is why we suffer such pain when we finally have to put down a dog from disease. So clearly, life only truly begins with the development, connection, and functioning of a cerebral cortex at about the 24th week. Before then, human life in the special sense is not yet present, and the fetus is just a living parasite. And even the Catholic Church held this view, that males became ensouled at six weeks and females at thirteen weeks, as developed by Aquinas. This remained church doctrine until 1869.

Silver does a good job of clarifying how competing forces can alter the outcome of evolutionary mechanisms once humans acquire the ability to reason and become subject to social or personal indoctrination, or take on belief-systems that run counter to natural instincts. He states,

> People whose genes programmed them with reproductive desire (separate from sexual desire) would be more likely to engage in activities that promoted successful pregnancy, childbirth, and parenting. Their children, in turn, would inherit the same genes and do the same for their children, and so on through each generation. Ultimately, the emotional desire to have children would spread

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> throughout the entire species. Of course, most of us know people who are childless by choice. How does biology explain this? The explanation comes from the single attribute that uniquely defines us as human beings. We alone – among all animal species – have evolved the intellectual capacity to comprehend and, at times, counteract the natural predispositions provided to us by our genes. And under certain circumstances of environment, culture, or intellect, reproductive desires can be rejected in favor of other desires centered more on the self, on other human beings, or other life goals.

This is a very important dilemma for any eugenics movement and also explains why society is now practicing deleterious social dysgenics that will further reduce the average level of intelligence genes in the population. Intelligent people have the ability to plan and carry out long- range goals, weigh options, and calculate what is the best course of action. They will refrain from early pregnancy in favor of getting an education, establishing themselves financially in an occupation, and only then will they plan and have children, sometimes. For many, the excitement and rewards of an active intellectual or financially rewarding occupation make having children less of a need and more often a burden. They can understand children and nurturing, will know what is developmentally best for children, but do not find any compelling reasons in an overpopulated world to have children just because they can. They will be the overclass with few or no children, with a loss of smart genes. In the future, they will be responsible for working and paying taxes in large part to support the underclass.

The underclass acts spontaneously, quite often acting on urges without thought, will get pregnant and often will have the children for their own entertainment and pleasure, or because they can't comprehend the costs of such a commitment. They will breed much more rapidly, much earlier, and they produce more and more children who will be less intelligent on average. This is the social dysgenics as practiced today, primarily because of the egalitarian intelligentsia that is committed to propping up the underclass while tearing down the middle and upper-class. These people are the remnants of the Bolsheviks that now preach a postmodernist agenda that rejects science for a utopian world based on their own visions, and in denial of the disaster that befalls any nation where the genetic capital of its

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population is in decline. If it continues, America will self-destruct in racial, class and ethnic conflict in the political arena, if not in actual violence.

Genetic engineering then has the potential for experimenting with alternatives that will allow people with a higher intellect to have more options for having children; and with financial tax incentives favoring productive working people rather than the perpetually under-employed or unemployed, political policy can once again turn to encouraging the more intelligent to have children. Silver explores some of the possible reproductive techniques that will open up opportunities. For example, he explains that birth defects for cloned children should occur less frequently than birth defects in naturally conceived children. And he claims that surveys have shown that 6 to 7 percent of the American adult population would be interested in cloning themselves. He points out that cloning will probably never be widespread, but that it is a way to preserve those unique individuals who were lucky enough to get all of the best genes available, making them remarkably valuable to society. The top 1% of society is responsible for all scientific and political policy advancements and breakthroughs. What a boon would it be to be able to clone 50 Stephen Hawkings in the future? especially with genetic engineering curing his debilitating disease – amyotrophic lateral sclerosis.

Silver then goes on to explain how lesbian couples could use genetic engineering so that their children would each have 25% of each person's genes, with 50% coming from a male donor. This would be a significant incentive for a truly committed and prosperous lesbian couple to have children of their own.

Likewise, surrogate mothers, a technology available now, could be extremely useful in encouraging the upper classes to have children. Willing to pay someone else to carry their children to term, women will not have to worry about gaining weight, losing their figures, not being able to continue working or being involved in social activities, etc. On the flip side, surrogacy will provide an opportunity for the poor to contribute to society while earning a living. They could also be under the watchful eye of the biological parents, who may be able to have the surrogate mother live with them, to make sure that the mother gets adequate nutrition, health check-ups, doesn't smoke, drink or do drugs, and generally is protected from harming the child even though she may not be of the highest intelligence. This would also help to train the

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surrogate mother how to protect her own children in case she should get pregnant naturally. But of course society will be better off if the less intelligent act merely as surrogates for having the children of the cognitively gifted, rather than contributing to dysgenic trends by having their own children with few prospects of meaningful employment in a world that demands intelligence.

Silver points out that surrogacy is opposed by many as a form of prostitution, but in reality it is just another form of reproductive freedom. This is no more prostitution than when a man, to support his family, has to descend into a dangerous coal mine day in and day out to labor in cramped and dirty conditions, to do what is necessary to survive. Surrogacy is a luxury compared to such a life, or to that of a share-cropper. So exactly what is objectionable? To sell oneself for surrogacy is a worthy purpose and therefore is not prostitution. It is giving to the well-being of the future gene pool. (Of course, the egalitarians are opposed to these concepts because they reject science and biology and are promoting a Marxist agenda of destroying the upper-class by trying to get the lower classes to multiply and then to rebel against their so-called masters. Just note the glee to which they have announced that thanks to immigration and social dysgenics, white America will soon be a minority. This is nothing less than open warfare against those very people who founded the United States. Any attempt to reverse these political goals by the Left will be condemned by any means possible.)

Silver points out that the elite moralists, having frightened the masses, have managed to outlaw surrogacy in many Western countries. But as the eugenics movement becomes international, it may be far easier to set up breeding farms in third world countries, under the watchful eyes of Western entrepreneurs, to make sure the mothers adhere to strict health practices, at a far cheaper cost than paying a higher price for such services in advanced countries. The children could then just be picked up when the child is born. And with the Internet, the biological parents could even look in on the surrogate mother from time to time to make sure the facilities are properly managed. What a boon to a eugenics program to encourage the productive members of society to have more children, especially when coupled with tax incentives that make having children monetarily rewarding as well as helping future generations by increasing the smart genes.

One fascinating proposal put forth by Silver is the possibility of

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speeding up evolutionary change by shortening the time per generation. For example, expectedly very bright children could be tested at an early age of 4 or 5 years old, and if they are highly intelligent, the germ cells could be collected and more children could be born by surrogate mothers. That means, instead of a new generation every 20 years, it would be reduced to 5 years with a four-fold increase in evolutionary advancement. He also discusses the bizarre possibility of using germ cells from aborted fetuses to generate new embryos. These children would be born to parents who had never lived. These strange reproductive technologies are less a threat to society from their actual commission, of course, than they are a threat to those who hold irrational belief-systems, who believe that humans are somehow distinct from other animals and have a soul that will allow them to escape death. Such people fear human genetic tampering because it threatens their philosophy.

Another interesting prospect Silver puts forth is the ease with which spermatogonial cells are self-renewing, even when transplanted into animals. That means the sperm cells from a Michael Jordan or an Arthur Jensen could be manufactured indefinitely by continuous harvesting and re-implantation into animals, making these highly valuable sperm cells available for centuries. More and more, rational people will be interested in producing truly remarkable and gifted children, rather than chancing a merely mediocre child. Or how about the executive who wants to marry for beauty but would like the children to be highly intelligent? In this case, donor eggs from the highly intelligent would replace the beautiful bimbo's genetic contribution. The best of both worlds, a beautiful mate and intelligent children!

Silver makes the point that

> At each stage throughout the evolution of our ancestors – from rodent-like mammals to apelike primates to Australopithecus to Homo habilis to Homo erectus and, finally, Homo sapiens – small groups of individuals gained genetic advantages that allowed them to survive even as they participated in the death of the species from which they arose!

And later,

> Civil libertarians tend to see any type of coercion as an

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> infringement on reproductive rights. And liberal libertarians would be strongly opposed to policies that discriminated against those born with avoidable medical conditions. Communitarians, however, may view the refusal to preselect against such medical conditions as inherently selfish. According to this point of view, such refusal would – by necessity – force society to help the unfortunate children through the expenditure of large amounts of resources and money that would otherwise be available to promote the welfare of many more people. The communitarian viewpoint is considered shocking to many in America today because, as Diane Paul says, 'the notion that individual desires should sometimes be subordinated to a larger social good has itself gone out of fashion, to be replaced by an ethic of radical individualism.'

For eugenics as a secular religion to take hold, it needs to include social eugenics and not merely personal eugenics. And we must view such a culture as communitarian and less individualistic, at least with regard to reproduction. It seems to me that a communitarian social structure, coupled with elimination of many of the moralistic prohibitions against consensual crimes, would be an ideal combination of freedom to enjoy life while improving the genetic capital of future generations. We are well on our way toward a world that can be freer of disease, hunger, ignorance, boredom, violence, hard labor, prejudice, ethnocentrism, religious fanaticism, irrational belief systems, and 12-step programs; for one that is based on social eugenics where a more intelligent populace will be able to utilize that higher intellect in their personal lives and in public life for controlling the selection of our leaders. It is only because of folk psychology and an inability to understand leadership relationships that evolved in the small tribe that we are so easily duped by our political and religious leaders. A much higher average intellect will make the herd mentality much more difficult to pray upon by demagogues and will lead to more stable political systems.

Though personal eugenics is considered to be much more benign than social eugenics, Silver has produced some remarkable scenarios of what might be expected in the near and not so far future. His vision includes the possibility of those with the wherewithall, both intellectually and financially, to use genetic engineering to select the best embryos for maturation, or even, in combination with embryo

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testing and selection, to insert new 'gene-packs' into their children to be passed on as a permanent genetic enhancements from that generation forward. These 'gene-packs' could enhance the individual into a truly designer child, and might begin the process of speciation where the new designed population will choose to split itself off from the Naturals. Unnless a new worldwide egalitarian totalitarianism stops this progress, it will only require one country to commit itself to a program of social eugenics and genetically enhance all its future citizens to emerge as a dominant power. What if China did this? Would we be willing to start a world war to prevent them from acquiring world dominance? As the technology becomes available it will be used somewhere, and no ideology will be able to stop it. So the question is, do we try and raise up everyone to a higher intellect and free of genetic disease, or do we try to suppress this creativity, and allow only other nations to benefit from it.

As Silver explains it:

> You can see the problem we are running into. If we allow the possibility that 'man's domain' extends into the nucleus – into the DNA itself – then by this line of reasoning, God's domain vanishes into ... nothingness. This frightening notion compels some people to draw a final line – a veritable last stand – around the genetic material.... Although all other intrusions into the body may work around the edges, genetic engineering, it seems, impinges on the essence of life itself – the soul. And the soul is clearly in God's domain. The sociologists Dorothy Nelkin and Susan Lindee describe it well: 'Just as the Christian soul has provided an archetypal concept through which to understand the person and the continuity of self, so DNA appears in popular culture as a soul-like entity, a holy and immortal relic, a forbidden territory. The similarity between the powers of DNA and those of the Christian soul, we suggest, is more than linguistic or metaphorical. DNA has taken on the social and cultural functions of the soul. It is the essential entity – the location of the true self ...

Nothing now can stop mankind from modifying its own future by means of genetic manipulation except by the horrific suppression of all that we know and understand about our past and the vision of what is available in the future. Man is the creator of his environment, and will

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now become the creator of the future generations of creators – the only legitimate creators left. Silver elegantly explains that

> While selfish genes do, indeed, control all other forms of life, master and slave have switched positions in human beings, who now have the power not only to control but to create new genes for themselves. Why not seize this power? Why not control what has been left to chance in the past? Indeed, we control all other aspects of our children's lives and identities through powerful social and environmental influences and, in some cases, with the use of powerful drugs like Ritalin or Prozac. On what basis can we reject positive genetic influences on a person's essence when we accept the rights of parents to benefit their children in every other way?

So do we continue on with social dysgenics, as advocated by the egalitarians, while the average IQ of humans declines and leads us back into barbarism and cruelty, or do we embrace social eugenics and elevate everyone's intelligence, thereby advancing us to higher and yet higher levels of moral and intellectual ability beyond that of our present species? Genetically we will always be moving in one direction or another. As gene frequencies keep changing in density within populations, evolution dictates that humankind cannot remain genetically stagnant, and that the trend will be either eugenic or dysgenic. Today, the choice is ours.

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The One-Eyed God: Odin and the (Indo-)Germanic Männerbünde

by Kris Kershaw, Ph.D.

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Abbreviations; Glossary; **The Eye in the Well**: *grandaevus altero orbus oculo*; Odin's pledge; *Heiti* relating to Odin's eyesight; *Blindr*; Other possible *heiti*; "Blind," not "the blinder"; Other depictions of Odin/Wodan; Snorri and Saxo; Wodan, Woden, et. al; Iconography; Odin the Wolf-god; An overview of the book; **PART I. HERJANN: The *Einheriar***: Snorri's description of the *Einheriar*; The word *einheriar*; *Herr and Herjann*; PIE ***koryonos***; Thor *Einheri* and the *Einheriar*; ***Der Schimmelreiter***: The Host and the Hunt; Legend, myth, and cult; The matter of the *Männerbund*; The Dead and the living; Age sets and ancestor cult; Masks; Masks and ancestor cult; Demon horses; The Rider-god; The Ancestors bring blessings; Feasts of the Changing Year; Harlequin; ***Feralis exercitus***: *Harii*; *Chatti*; *Weihekrieger*; Civilis; Haraldr Hárfagr; The hairstyles of the *Suevi*; Procopius and Ammianus on youthful warriors; An analog from Doric Greece; The liminal state (*marge*); Exiting *marge*; Demon warriors; An initiation scenario in *Völsungasaga*; Dæmon warriors among the Chatti; Two armies of the dead; *Mercurius*; Hermes at the boundaries of space and time; ***Furor Teutonicus***: ***wōþ-***; *Óðr*; *Óðinn*; The suffix -no-; Examples; A "Führersuffix"?; The suffix -no- in divine names; Poets' god and Rune-master; Ecstasy, Possession, Inspiration, Madness; Ecstasy; *Furor heroicus*; War dances; Dancing gods; *Mysterium* and *Mimus* in the *Anabasis*; The sword-dance in Germania; Mars and the Salii; Κούρητες, Κουρῆτες, Κορύβαντες; The Maruts; Some conclusions; Veratýr; **PART II. THE INDO-EUROPEAN MÄNNERBUND: *teutā* and *koryos***: *Equites* and *pedites*; Village and Forest; **The *koryos***: *Raubrecht*; The *Manes*; Animal transformations; Times and seasons; Festivals; Seasonal activities; Sub-groups; Small bands; Groups of 50; Older ***koryos-bündler***; *Weihekrieger*; Men without property; *Männerbund* and *Gefolgschaft*; ***Canis* and the *koryos***: Wolf and Dog; Ethnonymns and

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University of Texas, Austin

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